ETSI EN 300 086 V2.1.2 (2016-08)

TEST REPORT

For

Quanshun Communication Technology Co., Ltd

Quanshun Bldg., Daxiamei, Nan'an, Quanzhou, Fujian, China

Tested Model: D30
Series Model: D3X, D33, D35, D36, D37, D38, D39

Report Type:	**Product Type:**
Original Report	DMR Digital Portable Radio

Project Engineer:	Stone Zhang
Report Number:	RXM210414051-01A
Report Date:	2021-06-29
Reviewed By:	Oscar Ye EMC Manager
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road,Kunshan,Jiangsu province,China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

Applicant:	Quanshun Communication Technology Co., Ltd
Tested Model:	D30
Series Model:	D3X, D33 ,D35, D36, D37, D38, D39
Product Type:	DMR Digital Portable Radio
Power Supply:	DC 7.4V from battery; DC 5V/12V charging by adapter
Rated Power:	H: 5.0W, L: 1.0W
Operating Frequency Band:	400 MHz-470 MHz
Modulation Mode:	FM
Channel Spacing:	12.5 kHz, 25 kHz
Antenna Type:	Monopole antenna
*Maximum Antenna Gain:	0.0 dBi

Adapter-1 Information:
Model: GQ05A-050100-ZG
Input: AC 100-240V~50/60Hz, 0.15A
Output: DC 5.0V, 1.0A, 5.0W

Adapter-2 Information:
Model: GQ24-120200-AG
Input: AC 100-240V~50/60Hz,1.0A, Max
Output: DC 12.0V, 2.0A, 24.0W

**Note: The maximum antenna gain was declared by the applicant.*

Note: The difference between tested model and series model was explained in the attached declaration letter.

**All measurement and test data in this report was gathered from production sample serial number: RXM2104014051-1 (Assigned by BACL, Kunshan). The EUT was received on 2021-04-14.*

Objective

This Type approval report is prepared on behalf of *Quanshun Communication Technology Co., Ltd* in accordance with ETSI EN 300 086 V2.1.2 (2016-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Land Mobile Service; Radio equipment with an internal or external RF connector intended primarily for analogue speech; Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU

The objective is to determine the compliance of the EUT with ETSI EN 300 086 V2.1.2 (2016-08).

Test Methodology

All measurements contained in this report were conducted with ETSI EN 300 086 V2.1.2 (2016-08).

Measurement uncertainty

According to the requirements of ETSI EN 300 086 (the value of the measurement uncertainty according to the requirements of ETSI TR 100 028) shall be, for each measurement, equal to or lower than the figure in the following table:

SN	Parameter	Flab	Maximum allowable uncertainty
1	Radio Frequency	$\pm 0.082\times10^{-6}$	$\pm 1\times10^{-7}$
2	RF Power (up to 160W)	±0.61dB	±0.75dB
3	Radiated RF Power	±3.58dB	±6dB
4	adjacent channel power	±0.93dB	±5dB
5	Conducted spurious emission of transmitter valid up to 12,75 GHz	±2.47dB	±4dB
6	Conducted spurious emission of receiver, valid up to 12,75 GHz	±2.47dB	±7dB
7	Two-signal measurement, valid up to 4 GHz	±3.10dB	±4dB
8	Three-signal measurement	±1.2dB	±3dB
9	Radiated emission of the transmitter, valid up to 4 GHz	±3.62dB	±6dB
10	Radiated emission of receiver, valid up to 4 GHz	±3.62dB	±6dB
11	Transmitter intermodulation	±1.59dB	±3dB
12	Receiver desensitization (duplex operation)	±0.5 dB	±0.5 dB
13	Temperature	±1℃	±1℃
14	Humidity	±5 %	±10 %

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road,Kunshan,Jiangsu province,China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01 and CAB identifier CN0004 under the ISED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The EUT was configured for testing in a test mode.

Support Equipment List and Details

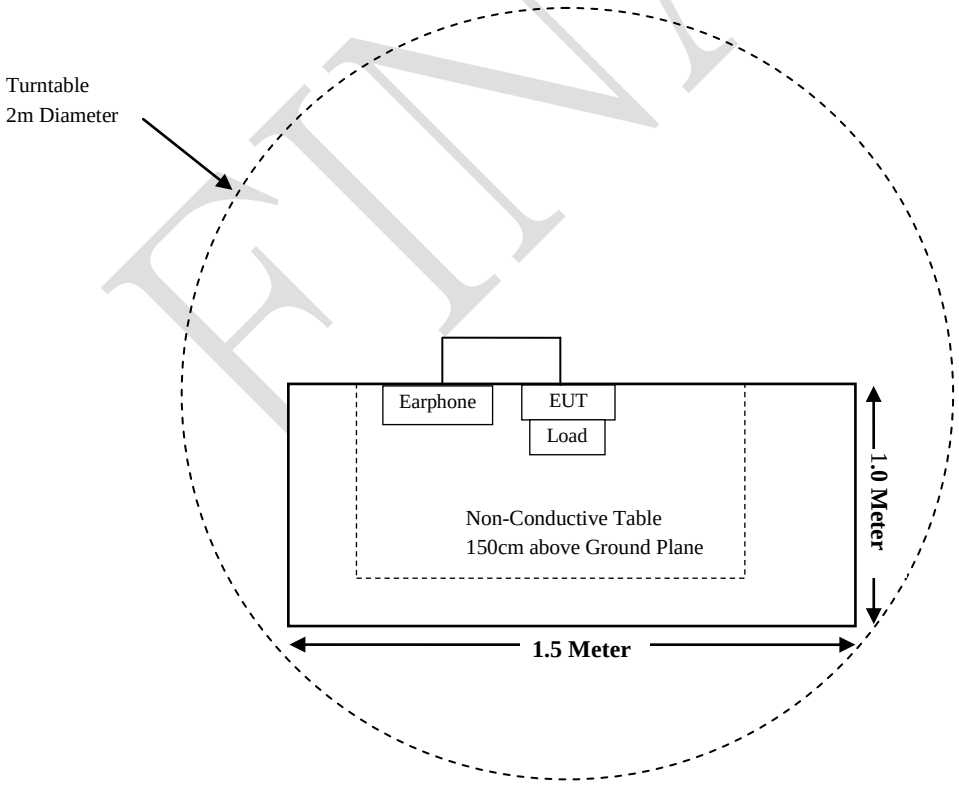
Manufacturer	Description	Model	Serial Number
Huaxiang	50OhmCoaxial load	4.3/10TF20-8	17011301
BOLD	Earphone	/	/

External I/O Cable

Cable Description	Length (m)	From/Port	To
Audio Cable	1.0	EUT	Earphone

Block Diagram of Test Setup

For radiated emissions(Below 1GHz & Above 1GHz):



SUMMARY OF TEST RESULTS

ETSI EN 300 086 V2.1.2 (2016-08)

Description of Test	ETSI EN 300 086 V2.1.2 (2016-08)	Test Result
Frequency error	§ 7.1	Compliant
Transmitter power (conducted)	§ 7.2	Compliant
Maximum effective radiated power	§ 7.3	Not applicable (Note 1)
Frequency Deviation	§ 7.4	Compliant
Adjacent and alternate channel power	§ 7.5	Compliant
Unwanted emissions in the spurious domain	§ 7.6	Compliant
Intermodulation attenuation.	§ 7.7	Not applicable (Note 2)
Maximum usable receiver sensitivity (Conducted)	§ 8.1	Compliant
Maximum usable sensitivity (field strength)	§ 8.2	Not applicable (Note 1)
Co-channel rejection.	§ 8.3	Compliant
Adjacent channel selectivity	§ 8.4	Compliant
Spurious response rejection	§ 8.5	Compliant
Intermodulation response rejection	§ 8.6	Compliant
Blocking or desensitization	§ 8.7	Compliant
Receiver spurious radiations	§ 8.8	Compliant
Receiver desensitization (with simultaneous transmission and reception)	§ 9.1	Not applicable (Note 3)
Receiver spurious response rejection (with simultaneous transmission and reception)	§ 9.2	Not applicable (Note 3)

Note1: The EUT has an external antenna connector.
Note2: The EUT doesn't apply in base stations.
Note3: The EUT doesn't belong to Duplex equipment.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test（Chamber 1#）					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2020-11-27	2021-11-26
HP	Signal Generator	N5183A	MY51040755	2020-11-27	2021-11-26
Sunol Sciences	Broadband Antenna	JB3	A090314-1	2020-08-05	2023-08-04
Sunol Sciences	Bilog antenna	JB3	A060217	2020-11-28	2023-11-27
Sonoma Instrunent	Pre-amplifier	310N	171205	2020-08-14	2021-08-13
Rohde & Schwarz	CE Test software	EMC32	100357	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-8	008	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-7	007	2020-08-15	2021-08-14
Radiated Emission Test（Chamber 2#）					
HP	Signal Generator	N5183A	MY51040755	2020-11-27	2021-11-26
Rohde & Schwarz	EMI Test Receiver	ESU40	100207/040	2021-04-01	2022-03-31
ETS-LINDGREN	Horn Antenna	3115	9311-4159	2020-07-15	2023-07-14
ETS-LINDGREN	Horn Antenna	3115	6229	2020-01-07	2023-01-06
A.H.Systems,inc	Amplifier	PAM-0118P	512	2020-08-14	2021-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-6	006	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-16	016	2020-08-15	2021-08-14
RF Conducted Test					
Rohde & Schwarz	SMBV100A Vector Signal Generator	SMBV100A	261558	2020-07-28	2021-07-27
Rohde & Schwarz	SMB 100A Signal Generator	SMB100A	110390	2020-07-28	2021-07-27
HP	RF communication test SET.	8920B	US36141849	2021-04-01	2022-03-31
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048/027	2020-11-27	2021-11-26
Rohde & Schwarz	EMI Test Receiver	ESIB26	100146	2020-11-27	2021-11-26
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2020-07-28	2021-07-27
EAST	Regulated DC Power Supply	MCH-303D-II	14070562	2020-10-10	2021-10-09
BACL	Temperature & Humidity Chamber	BTH-150	30023	2020-11-25	2021-11-24
Quanshun	RF Cable	Quanshun C01	C01	Each Time	N/A

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

ETSI EN 300 086 V2.1.2 (2016-08) §7.1 - FREQUENCY ERROR

Applicable Standard

According to ETSI EN 300 086 V2.1.2 (2016-08) §7.1.1, the frequency error of the transmitter is the difference between the measured carrier frequency in the absence of modulation and the nominal frequency of the transmitter.

The frequency error shall not exceed the values given in the table below, under normal and extreme test conditions

Channel separation (kHz)	Frequency error limit (kHz)				
	below 47 MHz	47 MHz to 137 MHz	above 137 MHz to 300 MHz	above 300 MHz to 500 MHz	above 500 MHz to 1 000 MHz
20 and 25	±0,60	±1,35	±2,00	±2,00	±2,50 (a)
12,5	±0,60	±1,00	±1,00 (B) ±1,50 (M)	±1,00 (B) ±1,50 (a) (M)	±1,5 (B) ±2,5 (a) (M)

NOTE: (B) = base station.
(M) = mobile or hand portable station.
(a) = for hand portable stations having integral power supplies, the frequency error shall not be exceeded over a temperature range of 0 °C to + 40 °C.
Under extreme temperature conditions (clause 5.4.1), the frequency error shall not exceed ±2,50 kHz for a channel separation of 12,5 kHz between 300 MHz and 500 MHz, and ±3,00 kHz for channel separations of 20 kHz and 25 kHz between 500 MHz and 1 000 MHz.

Method of measurement

The equipment shall operate in continuous transmission mode during the time necessary to perform the measurement of the frequency.

Measurement arrangement

The equipment shall be connected to the artificial antenna. The measurement arrangement in figure above shall be used. The carrier frequency shall be measured in the absence of modulation. The measurement shall be made under normal test conditions and extreme test conditions.

Test Data

Environmental Conditions

Temperature:	25.3 °C
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa

The testing was performed by Stone Zhang on 2021-06-24.

Test Result: Compliant

UHF:

Channel	f_c (MHz)	Test Conditions		Measured Frequency (MHz)	Frequency Error (kHz)	Limit (kHz)
		Temperature (℃)	Voltage (V_{DC})			
Low	400.025	Tnor = +25	7.4	400.02518	0.18	+/-1.5
		Tmin = -30	6.0	400.02520	0.20	+/-2.5
			7.4	400.02516	0.16	+/-2.5
		Tmax = +40	6.0	400.0252	0.2	+/-2.5
			7.4	400.02518	0.18	+/-2.5
Middle	435.000	Tnor = +25	7.4	435.00017	0.17	+/-1.5
		Tmin = -30	6.0	435.00017	0.17	+/-2.5
			7.4	435.00020	0.20	+/-2.5
		Tmax = +40	6.0	435.00015	0.15	+/-2.5
			7.4	435.00020	0.20	+/-2.5
High	469.975	Tnor = +25	7.4	469.97511	0.11	+/-1.5
		Tmin = -30	6.0	469.97515	0.15	+/-2.5
			7.4	469.97519	0.19	+/-2.5
		Tmax = +40	6.0	469.97519	0.19	+/-2.5
			7.4	469.97513	0.13	+/-2.5

Note: The measurement was measured in the absence of modulation.

ETSI EN 300 086 V2.1.2 (2016-08) §7.2- TRANSMITTER POWER (CONDUCTED)

Applicable Standard

According to ETSI EN 300 086 V2.1.2 (2016-08) §7.2.1, the transmitter power (conducted) is the mean power delivered to the artificial antenna during a radio frequency cycle, in the absence of modulation.

The rated output power is the transmitter power (conducted) of the equipment declared by the manufacturer.

Limits

The transmitter power (conducted) under the specified conditions of measurement and at normal test conditions shall be within ±1, 5 dB of the rated carrier power (conducted). The transmitter power (conducted) under extreme test conditions shall be within +2, 0 dB and -3, 0 dB of the rated output power.

NOTE: It is assumed that the appropriate National Administration will state the maximum permitted transmitter output power.

Method of measurement

Measurement arrangement

For practical reasons, measurements shall be performed only at the lowest and highest power level at which the transmitter is intended to operate.

The measurement arrangement in figure above shall be used.

The measurement shall be performed in the absence of modulation.

The transmitter shall be set in continuous transmission mode.

The transmitter shall be connected to a power attenuator and the mean power delivered to this artificial antenna shall be measured.

The measurement shall be made under normal test conditions and extreme test conditions.

Test Data

Environmental Conditions

Temperature:	24.6 °C
Relative Humidity:	54 %
ATM Pressure:	101.1 kPa

The testing was performed by Stone Zhang on 2021-06-24.

Test Result: Compliant

High power level:

Channel	f_c (MHz)	Test Conditions		Measured Power (dBm)	P（rated） (dBm)	Limit (dB)
		Temperature (℃)	Voltage (V_{DC})			
Low	400.025	Tnor = +25	7.4	36.08	37	±1.5
		Tmin = -30	6.0	36.27	37	-3.0,+2.0
			7.4	36.34	37	-3.0,+2.0
		Tmax = +40	6.0	35.79	37	-3.0,+2.0
			7.4	35.85	37	-3.0,+2.0
Middle	435.000	Tnor = +25	7.4	36.03	37	±1.5
		Tmin = -30	6.0	36.24	37	-3.0,+2.0
			7.4	36.31	37	-3.0,+2.0
		Tmax = +40	6.0	35.75	37	-3.0,+2.0
			7.4	35.81	37	-3.0,+2.0
High	469.975	Tnor = +25	7.4	36.15	37	±1.5
		Tmin = -30	6.0	36.37	37	-3.0,+2.0
			7.4	36.43	37	-3.0,+2.0
		Tmax = +40	6.0	35.84	37	-3.0,+2.0
			7.4	35.90	37	-3.0,+2.0

Note 1: The measurement was made in the absence of modulation.
Note 2: The rated high power is 5.0W.

Low power level:

Channel	f_c (MHz)	Test Conditions		Measured Power (dBm)	P（rated） (dBm)	Limit (dB)
		Temperature (℃)	Voltage (V_{DC})			
Low	400.025	Tnor = +25	7.4	29.78	30	±1.5
		Tmin = -30	6.0	29.98	30	-3.0,+2.0
			7.4	30.06	30	-3.0,+2.0
		Tmax = +40	6.0	29.59	30	-3.0,+2.0
			7.4	29.63	30	-3.0,+2.0
Middle	435.000	Tnor = +25	7.4	29.02	30	±1.5
		Tmin = -30	6.0	29.27	30	-3.0,+2.0
			7.4	29.33	30	-3.0,+2.0
		Tmax = +40	6.0	28.76	30	-3.0,+2.0
			7.4	28.81	30	-3.0,+2.0
High	469.975	Tnor = +25	7.4	29.3	30	±1.5
		Tmin = -30	6.0	29.53	30	-3.0,+2.0
			7.4	29.59	30	-3.0,+2.0
		Tmax = +40	6.0	28.96	30	-3.0,+2.0
			7.4	29.01	30	-3.0,+2.0

Note 1: The measurement was made in the absence of modulation.
Note 2: The rated low power is 1.0 W.

ETSI EN 300 086 V2.1.2 (2016-08) §7.4- FREQUENCY DEVIATION

Applicable Standard

According to ETSI EN 300 086 V2.1.2 (2016-08) §7.4.1

The frequency deviation is the maximum difference between the instantaneous frequency of the modulated radio frequency signal and the carrier frequency in the absence of modulation.

The maximum permissible frequency deviation is the maximum value of frequency deviation stated for the relevant channel separation.

Test Procedure

According to ETSI EN 300 086 V2.1.2 (2016-08) §7.4.2

Limits:

According to ETSI EN 300 086 V2.1.2 (2016-08) §7.4.3

The maximum permissible frequency deviation for modulation frequencies from the lowest frequency transmitted (f_1) by the equipment (as declared by the manufacturer) up to (f_2) shall be as the specified.

Channel Separation in kHz	Maximum Permissible Frequency Deviation (MPFD) in kHz
12.5	±2.5
20	±4.0
25	±5.0

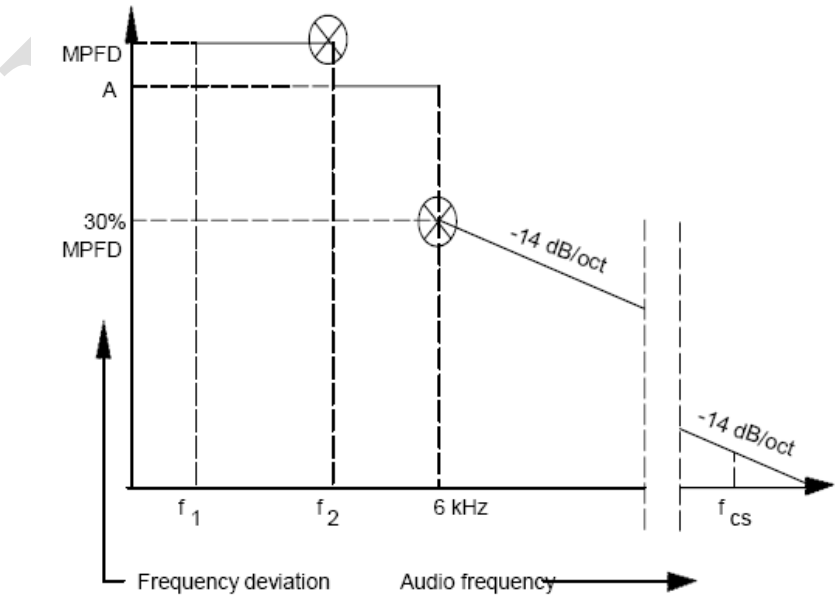


Figure: Template showing the MPFD versus modulation frequency

- f1 lowest appropriate frequency;
- f2 3, 0 kHz (for 20 kHz or 25 kHz channel separation); or – 2.55 kHz (for 12.5 kHz channel separation);
- MPFD maximum permissible frequency deviation between f1 and f2, clause 5.1.3.1;
- A measured frequency deviation at f2;
- fcs frequency equal to channel separation.

Test Data

Environmental Conditions

Temperature:	24.6 °C
Relative Humidity:	54 %
ATM Pressure:	101.1 kPa

The testing was performed by Stone Zhang on 2021-06-24.

EUT operation mode: Transmitting

Low Channel (400.025 MHz) @12.5 kHz Channel Separation

Audio Frequency (Hz)	Test Value (Hz)	Limit (Hz)
300	932	2500
400	1307	2500
500	1569	2500
600	1742	2500
700	1775	2500
800	1810	2500
900	1920	2500
1000	2028	2500
1200	2036	2500
1400	2056	2500
1600	2048	2500
1800	2031	2500
2000	2045	2500
2200	2043	2500
2400	2059	2500
2550	2063	2500
2550	2063	2063
2600	1854	2063
2800	1705	2063
3000	1552	2063
3500	1438	2063
4000	1270	2063
5000	1098	2063
6000	636	2063
6000	636	750
7000	423	524
8000	266	384
9000	168	292
10000	79	229
11000	52	183
12000	28	150
12500	28	136

Middle Channel (435.000 MHz) @12.5 kHz Channel Separation

Audio Frequency (Hz)	Test Value (Hz)	Limit (Hz)
300	933	2500
400	1301	2500
500	1564	2500
600	1741	2500
700	1775	2500
800	1817	2500
900	1909	2500
1000	2021	2500
1200	2037	2500
1400	2055	2500
1600	2047	2500
1800	2038	2500
2000	2045	2500
2200	2045	2500
2400	2057	2500
2550	2063	2500
2550	2063	2063
2600	1860	2063
2800	1707	2063
3000	1554	2063
3500	1436	2063
4000	1280	2063
5000	1098	2063
6000	632	2063
6000	632	750
7000	430	524
8000	263	384
9000	163	292
10000	73	229
11000	53	183
12000	27	150
12500	29	136

High Channel (469.975 MHz) @12.5 kHz Channel Separation

Audio Frequency (Hz)	Test Value (Hz)	Limit (Hz)
300	928	2500
400	1304	2500
500	1557	2500
600	1731	2500
700	1767	2500
800	1816	2500
900	1914	2500
1000	2021	2500
1200	2038	2500
1400	2054	2500
1600	2044	2500
1800	2035	2500
2000	2048	2500
2200	2041	2500
2400	2054	2500
2550	2070	2500
2550	2070	2070
2600	1859	2070
2800	1707	2070
3000	1556	2070
3500	1433	2070
4000	1277	2070
5000	1099	2070
6000	634	2070
6000	634	750
7000	427	524
8000	262	384
9000	169	292
10000	71	229
11000	52	183
12000	29	150
12500	28	136

Low Channel (400.025 MHz) @ 25kHz Channel Separation

Audio Frequency (Hz)	Test Value (Hz)	Limit (Hz)
300	2269	5000
400	2847	5000
600	3774	5000
700	4111	5000
800	4167	5000
900	4245	5000
1000	4282	5000
1200	4323	5000
1400	4176	5000
1600	4234	5000
1800	4256	5000
2000	4260	5000
2200	4297	5000
2400	4280	5000
2600	4298	5000
2800	4241	5000
3000	4318	5000
3000	4318	4318
3500	4096	4318
4000	3508	4318
4500	2989	4318
5000	2458	4318
5500	1962	4318
6000	634	4318
6000	634	1500
8000	597	768
10000	589	457
12000	235	299
14000	129	209
16000	82	153
18000	52	117
20000	34	91
22000	35	73
24000	31	60
25000	32	54

Middle Channel (435.000 MHz) @ 25 kHz Channel Separation

Audio Frequency (Hz)	Test Value (Hz)	Limit (Hz)
300	2270	5000
400	2850	5000
500	3766	5000
600	4108	5000
700	4172	5000
800	4246	5000
900	4290	5000
1000	4323	5000
1200	4165	5000
1400	4234	5000
1600	4250	5000
1800	4265	5000
2000	4294	5000
2200	4287	5000
2400	4295	5000
2600	4248	5000
2800	4151	5000
3000	4303	5000
3000	4303	4303
3500	3506	4303
4000	2987	4303
4500	2455	4303
5000	1969	4303
5500	1506	4303
6000	734	4303
6000	734	1500
8000	586	768
10000	231	457
12000	125	299
14000	82	209
16000	55	153
18000	35	117
20000	34	91
22000	35	73
24000	35	60
25000	35	54

High Channel (469.975 MHz) @ 25 kHz Channel Separation

Audio Frequency (Hz)	Test Value (Hz)	Limit (Hz)
300	2267	5000
400	2851	5000
500	3772	5000
600	4101	5000
700	4178	5000
800	4254	5000
900	4291	5000
1000	4329	5000
1200	4162	5000
1400	4239	5000
1600	4253	5000
1800	4262	5000
2000	4299	5000
2200	4289	5000
2400	4297	5000
2600	4244	5000
2800	4156	5000
3000	4329	5000
3000	4329	4329
3500	3508	4329
4000	2983	4329
4500	2453	4329
5000	1968	4329
5500	1505	4329
6000	633	4329
6000	633	1500
8000	581	768
10000	236	457
12000	123	299
14000	81	209
16000	53	153
18000	33	117
20000	34	91
22000	35	73
24000	35	60
25000	33	54

ETSI EN 300 086 V2.1.2 (2016-08) §7.5 - ADJACENT AND ALTERNATE CHANNEL POWER

Applicable Standard

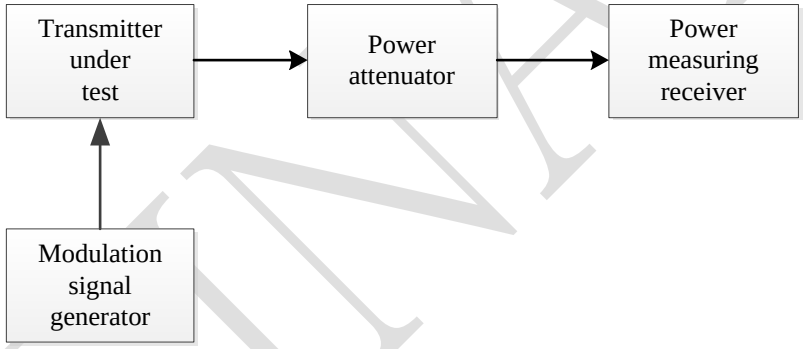
According to ETSI EN 300 086 V2.1.2 (2016-08) §7.5.1, The adjacent and alternate channel power is that part of the total power output of a transmitter under defined conditions of modulation, which falls within a specified Compliance-band centred on the nominal frequency of either of the adjacent and alternate channels. This power is the sum of the mean power produced by the modulation, hum and noise of the transmitter.

Limit:

For a channel separation of 12,5 kHz, 20 kHz and 25 kHz, the adjacent channel power shall not exceed a value of 60,0 dB below the transmitter power (conducted) without the need to be below 0,2 µW (-37 dBm). For a channel separation of 12,5 kHz, 20 kHz and 25 kHz, the alternate channel power shall not exceed a value of 70,0 dB below the transmitter power (conducted) without the need to be below 0,2 µW (-37 dBm).

Method of Measurement

This test measures the power transmitted in the adjacent and alternate channel(s) during continuous modulation.



Measurement arrangement

During the test, the transmitter shall be set in continuous transmission mode. If this is not possible, the measurements shall be carried out in a period shorter than the duration of the transmission.

Averaging measurements with 100 samples are possible. The measurement arrangement in figure 7 shall be used.

The adjacent channel power may be measured, as follows, with a power measuring receiver which conforms to annex B (referred to in this clause as the "receiver"):
a) the transmitter shall be operated at the transmitter power determined in clause 7.2 under normal test conditions (see clause 5.3). The output of the transmitter shall be linked to the input of the "receiver" by a connecting device such that the impedance presented to the transmitter is 50 Ω and the level at the "receiver input" is appropriate;
b) with the transmitter unmodulated, the tuning of the "receiver" shall be adjusted so that a maximum response is obtained. This is the 0 dB response point. The "receiver" attenuator setting and the reading of the metre shall be recorded;
c) the frequency of the "receiver" shall be adjusted above the carrier so that the "receiver" -6 dB response nearest to the transmitter carrier frequency is located at a displacement from the nominal carrier frequency as given in table below;

Frequency displacement

Channel separation (kHz)	Specified necessary bandwidth (kHz)	Displacement of the -6 dB point from the nominal carrier frequency (kHz)
12,5	8,5	8,25
20	14	13
25	16	17

d) the transmitter shall be modulated by a test signal of 1 250 Hz at a level which is 20 dB higher than that required to produce 60 % of the maximum permissible deviation, clause 7.4.3.1;
e) the "receiver" variable attenuator shall be adjusted to obtain the same metre reading as in step b), or a known relation to it;
f) the ratio of the adjacent channel power to the carrier power is the difference between the attenuator settings in steps b) and e), corrected for any differences in the reading of the metre.

For each adjacent channel, the adjacent channel power shall be recorded.
• the measurement shall be repeated with the frequency of the "receiver" adjusted below the carrier so that the "receiver" -6 dB response nearest to the transmitter carrier frequency is located at a displacement from the nominal carrier frequency as given in table 4a;
• the adjacent channel power of the equipment under test shall be expressed as the higher of the two values recorded in step f) for the upper and lower channels nearest to the channel considered. Steps c) to f) shall be repeated for the alternate channels with the values in table blew.

Frequency displacement

Channel separation (kHz)	Specified necessary bandwidth (kHz)	Displacement of the -6 dB point from the nominal carrier frequency (kHz)
12,5	8,5	20,75
20	14	33
25	16	42

For each alternate channel, the alternate channel power shall be recorded.
• the measurement shall be repeated with the frequency of the "receiver" adjusted below the carrier so that the "receiver" -6 dB response nearest to the transmitter carrier frequency is located at a displacement from the nominal carrier frequency as given in table 4b;

• the alternate channel power of the equipment under test shall be expressed as the higher of the two values recorded in step f) for the upper and lower channels nearest to the channel considered.

Test Data

Environmental Conditions

Temperature:	24.6 °C
Relative Humidity:	54 %
ATM Pressure:	101.3 kPa

The testing was performed by Stone Zhang on 2021-06-22.

Test Result: Compliant.

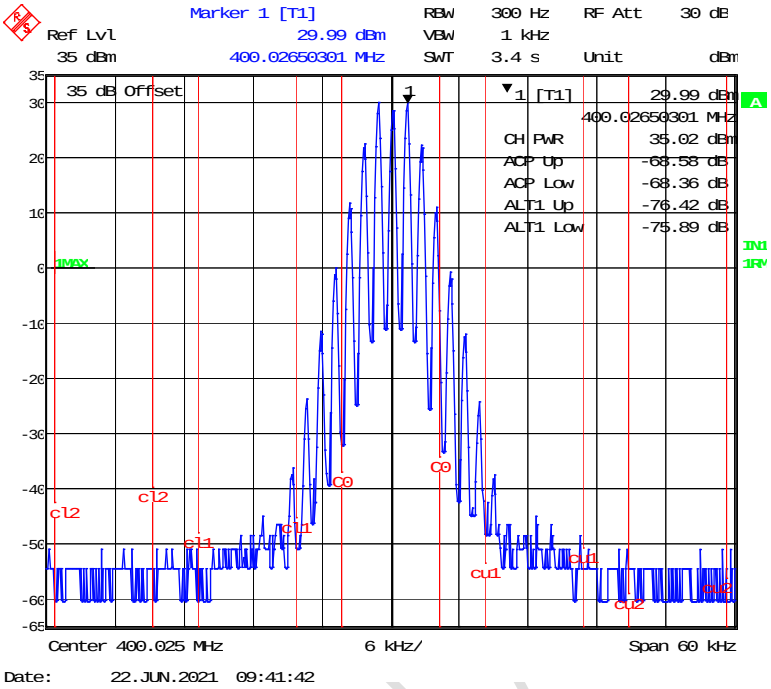
Power Level	Channel Separation	fc (MHz)		Adjacent Channel Power Ratio (dB)	Limit (dB)	Alternate Channel Power Ratio (dB)	Limit (dB)
High	12.5kHz	400.025	Upper Channel	-68.58	⩽ -60	-76.42	⩽ -70
			Lower Channel	-68.36	⩽ -60	-75.89	⩽ -70
		435.000	Upper Channel	-66.61	⩽ -60	-75.35	⩽ -70
			Lower Channel	-68.19	⩽ -60	-75.50	⩽ -70
		469.975	Upper Channel	-69.18	⩽ -60	-76.14	⩽ -70
			Lower Channel	-68.91	⩽ -60	-75.29	⩽ -70
Low	12.5kHz	400.025	Upper Channel	-65.76	⩽-60	-74.29	⩽ -70
			Lower Channel	-65.87	⩽ -60	-73.04	⩽ -70
		435.000	Upper Channel	-63.86	⩽ -60	-73.78	⩽ -70
			Lower Channel	-64.86	⩽ -60	-73.16	⩽ -70
		469.975	Upper Channel	-64.58	⩽ -60	-73.60	⩽ -70
			Lower Channel	-65.85	⩽ -60	-73.90	⩽ -70

Power Level	Channel Separation	fc (MHz)		Adjacent Channel Power Ratio (dB)	Limit (dB)	Alternate Channel Power Ratio (dB)	Limit (dB)
High	25kHz	400.025	Upper Channel	-74.18	⩽ -60	-72.85	⩽ -70
			Lower Channel	-74.05	⩽ -60	-72.59	⩽ -70
		435.000	Upper Channel	-73.35	⩽ -60	-72.39	⩽ -70
			Lower Channel	-73.96	⩽ -60	-71.66	⩽ -70
		469.975	Upper Channel	-73.53	⩽ -60	-73.16	⩽ -70
			Lower Channel	-74.15	⩽ -60	-72.01	⩽ -70
Low	25kHz	400.025	Upper Channel	-72.09	⩽-60	-72.68	⩽ -70
			Lower Channel	-72.76	⩽ -60	-72.36	⩽ -70
		435.000	Upper Channel	-71.00	⩽ -60	-72.43	⩽ -70
			Lower Channel	-71.12	⩽ -60	-70.62	⩽ -70
		469.975	Upper Channel	-72.76	⩽ -60	-72.56	⩽ -70
			Lower Channel	-71.11	⩽ -60	-70.48	⩽ -70

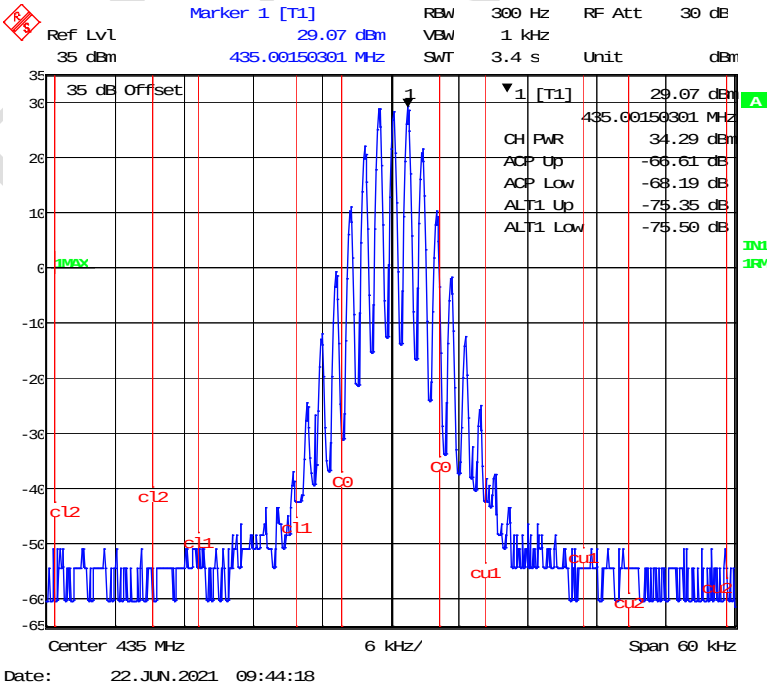
Highest RF Output Power:

12.5kHz:

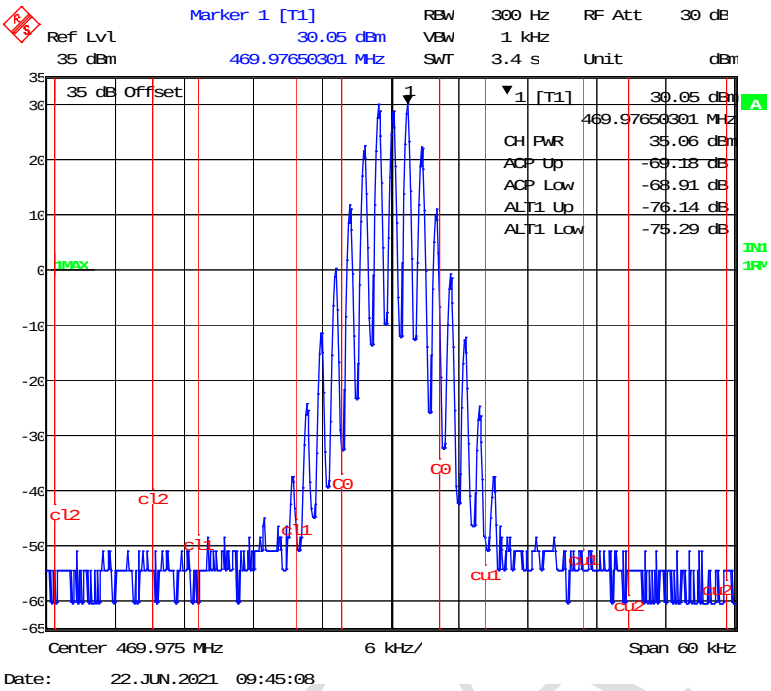
Low Channel 400.025MHz



Middle Channel 435.000MHz



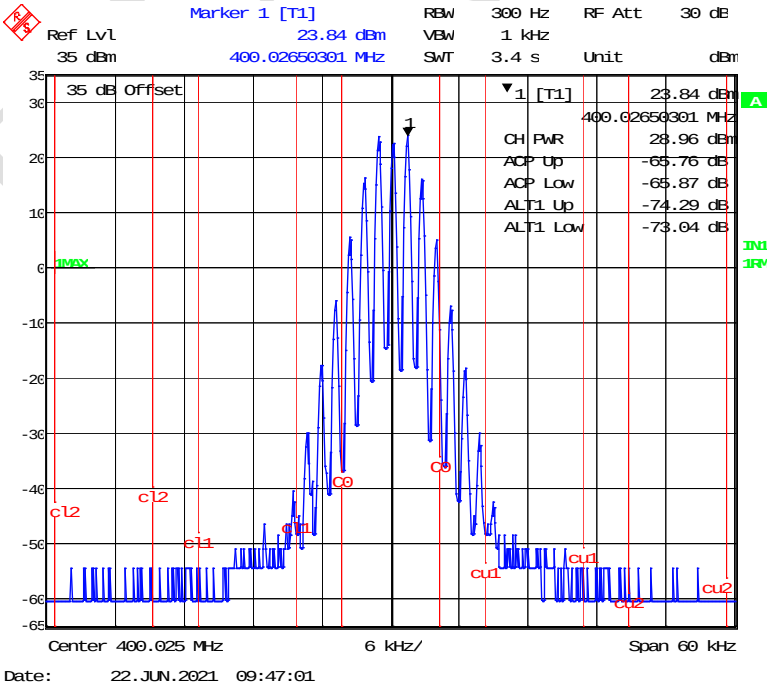
High Channel 469.975MHz



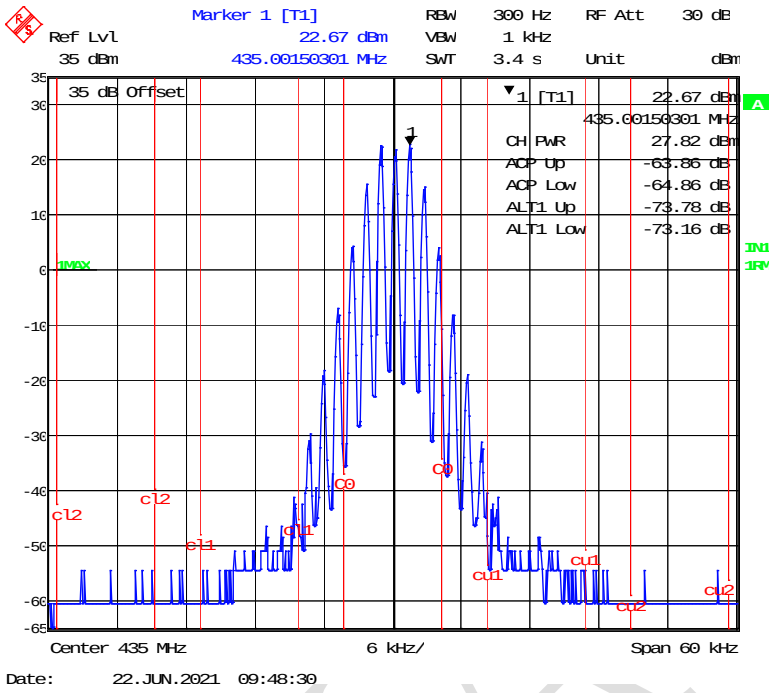
Lowest RF Output Power:

12.5kHz:

Low Channel 400.025MHz



Middle Channel 435.000MHz



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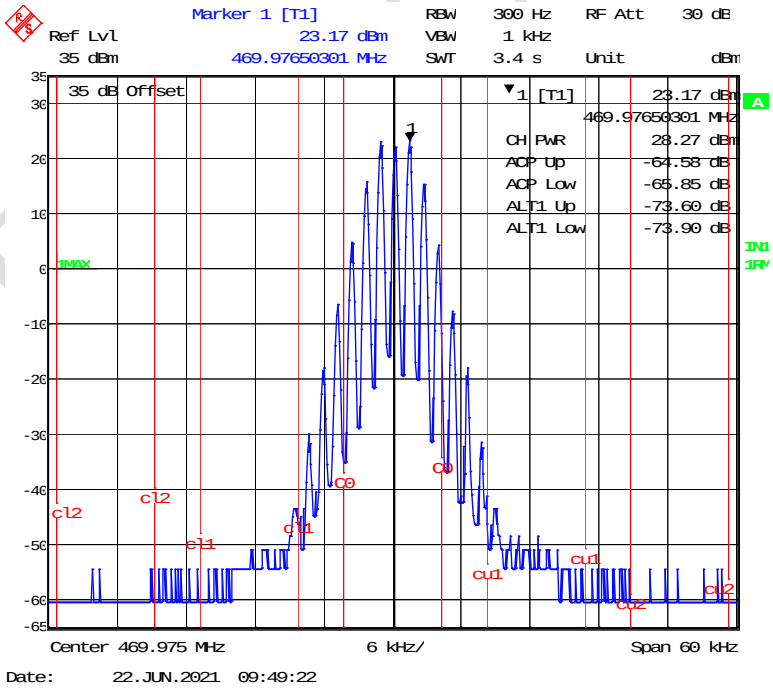
High Channel 469.975MHz



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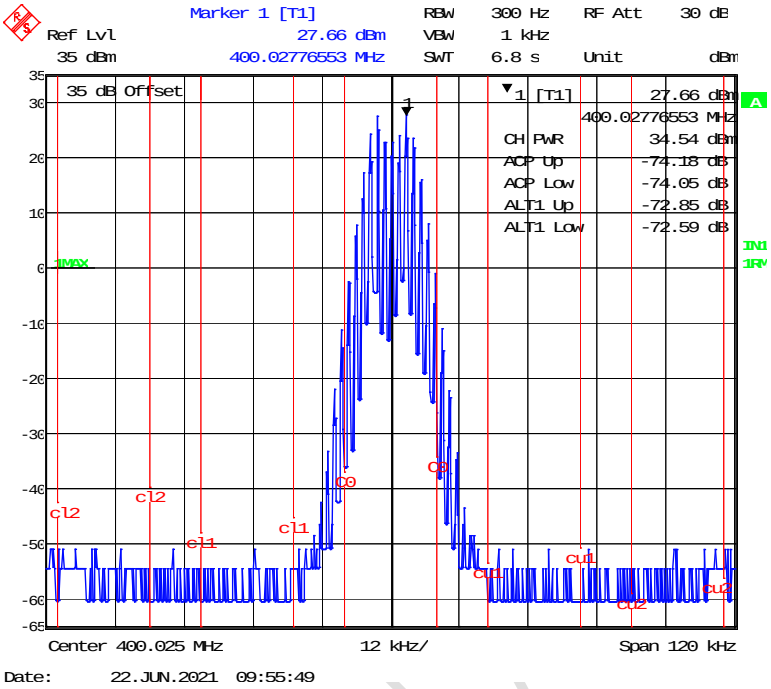
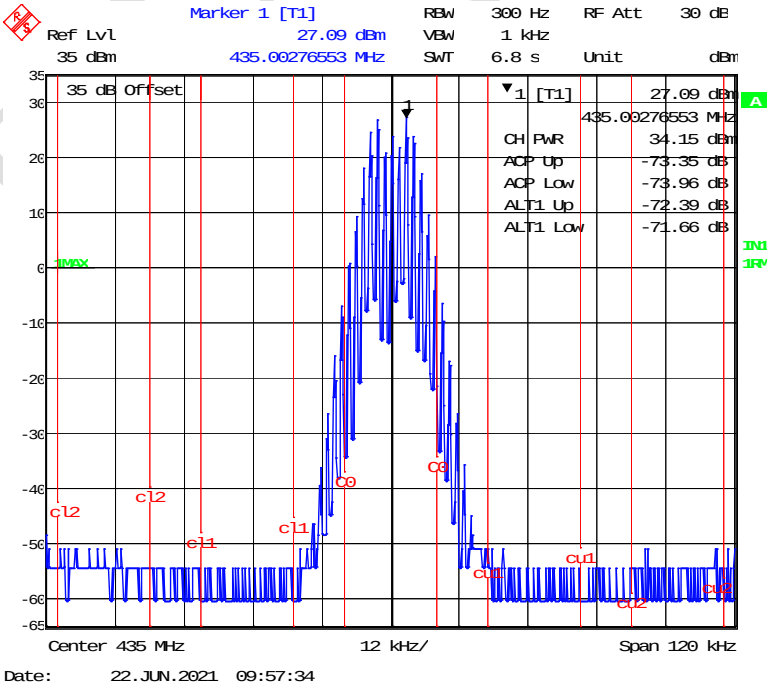
Highest RF Output Power:

25kHz:

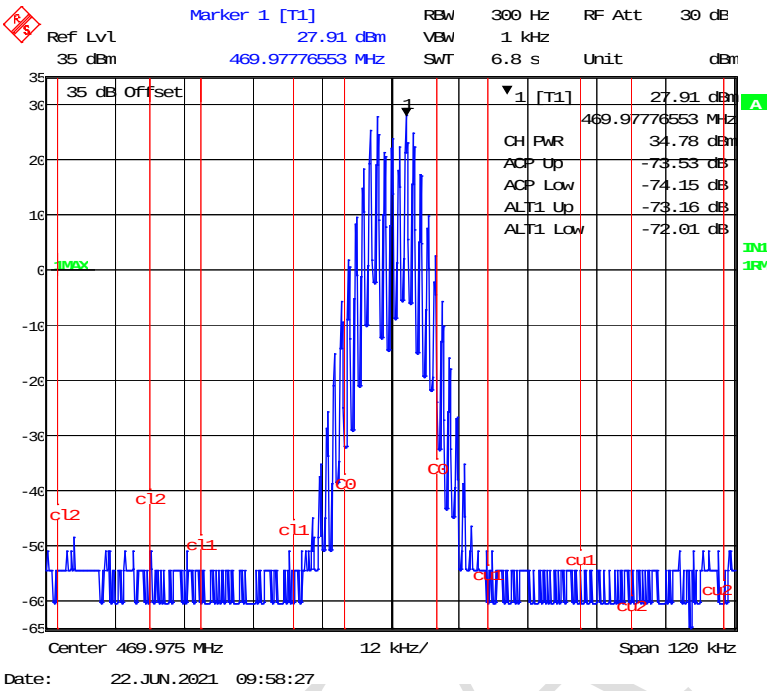
Low Channel 400.025MHz



Middle Channel 435.000MHz



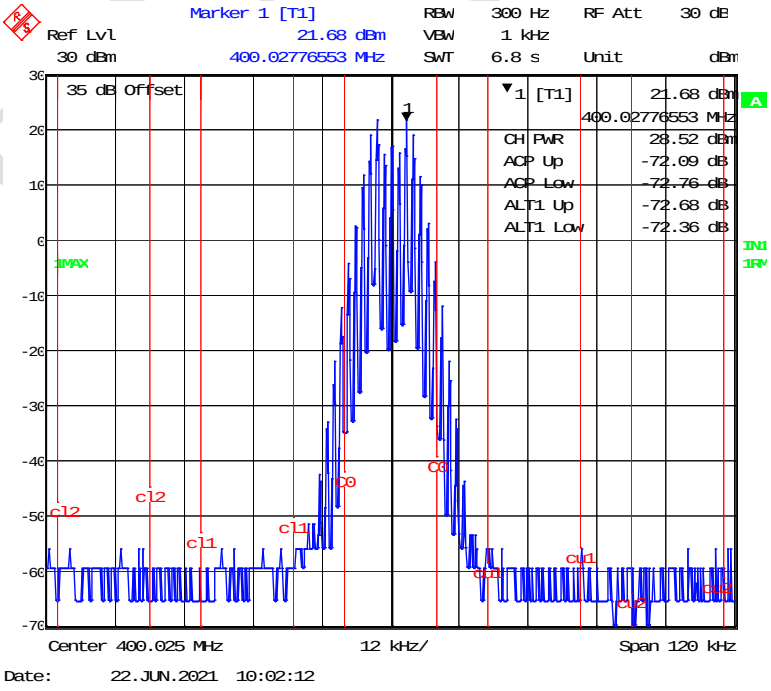
High Channle 469.975MHz



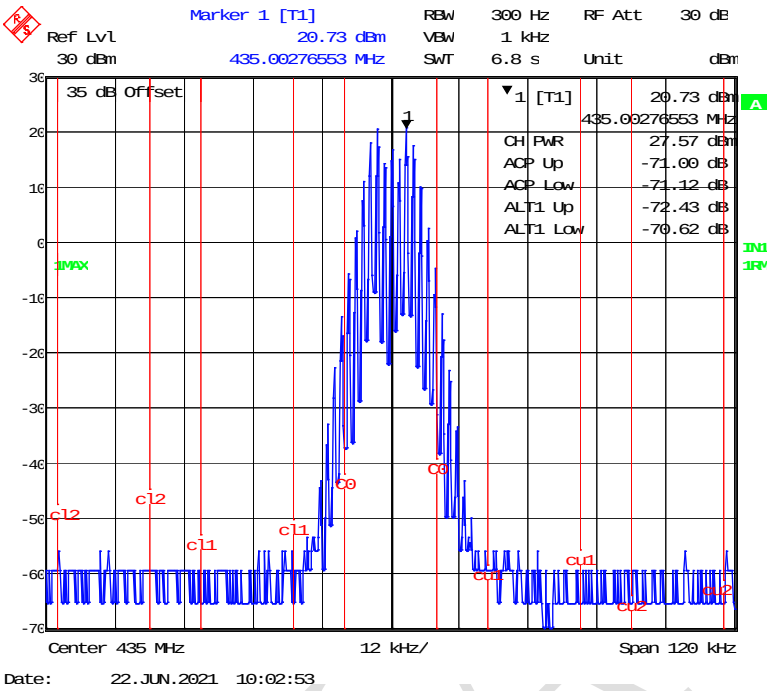
Lowest RF Output Power:

25kHz:

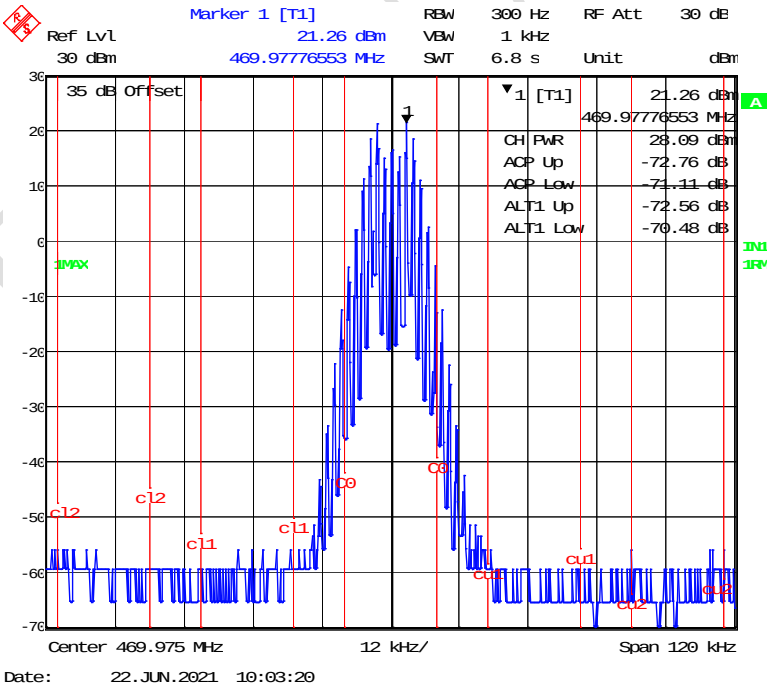
Low Channel 400.025MHz



Middle Channel 435.000MHz



High Channle 469.975MHz



ETSI EN 300 086 V2.1.2 (2016-08) §7.6 – UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

Applicable Standard

According to ETSI EN 300 086 V2.1.2 (2016-08) §7.6.1, Spurious emissions are emissions at frequencies other than those of the carrier and sidebands associated with normal modulation.

The level of spurious emissions shall be measured by:
either:
a) their power level in a specified load (conducted spurious emission); and
b) their effective radiated power when radiated by the cabinet and structure of the equipment (cabinet radiation); or
c) their effective radiated power when radiated by the cabinet and by the integral antenna, in the case of hand portable equipment fitted with such an antenna and no external RF connector.

NOTE: i.e. ((a and b) or c).

Limit:

The power of any spurious emission shall not exceed the values given in tables below.

Conducted emissions

Frequency range	Tx operating	Tx standby
9 kHz to 1 GHz	0,25 µW (-36 dBm)	2,0 nW (-57 dBm)
above 1 GHz to 4 GHz, or above 1 GHz to 12,75 GHz	1,00 µW (-30 dBm)	20 nW (-47 dBm)

Radiated emissions

Frequency range	Tx operating	Tx standby
30 MHz to 1 GHz	0,25 µW (-36 dBm)	2,0 nW (-57 dBm)
above 1 GHz to 4 GHz, or above 1 GHz to 12,75 GHz	1,00 µW (-30 dBm)	20 nW (-47 dBm)

Method of Measurement

According to ETSI EN 300 086 V2.1.2 (2016-08) §7.6

Test Data

Environmental Conditions

Temperature:	23.5~23.7 °C
Relative Humidity:	51~52 %
ATM Pressure:	101.1~101.3 kPa

The testing was performed by Stone Zhang from 2021-06-22 to 2021-06-29.

Test Result: Compliant

Note1: For radiated emission was tested at high rated power, which was the worst case.
Note2: For conducted spurious emissions were tested at high rated power, there was a band reject filter between the EUT and test equipment when testing.
Note3: The measurement was performed in the absence of modulation.
Note4: For standby mode, please see the following section 8.8 test results because the standby mode is receiver mode.

Radiated Emission Test Mode: Transmitting

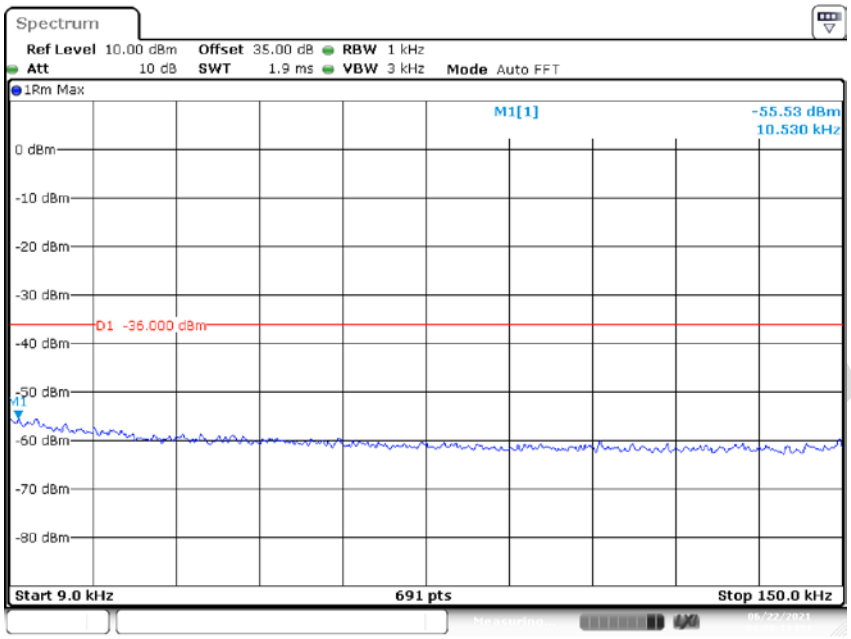
Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	EN 300 086	
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
Low Channel-400.025 MHz										
800.05	59.75	233	150	H	-38.47	0.62	-1.25	-40.34	-36	4.34
800.05	58.63	113	150	V	-39.79	0.62	-1.25	-41.66	-36	5.66
1200.08	66.25	101	150	H	-47.52	0.80	7.36	-40.96	-30	10.96
1200.08	67.07	65	150	V	-46.70	0.80	7.36	-40.14	-30	10.14
High Channel-469.975 MHz										
939.95	58.01	80	150	H	-39.80	0.64	-1.11	-39.14	-36	3.14
939.95	56.93	8	150	V	-37.30	0.64	-1.11	-39.05	-36	3.05
1409.93	67.92	205	150	H	-46.27	0.82	7.95	-39.14	-30	9.14
1409.93	66.30	14	150	V	-47.89	0.82	7.95	-40.76	-30	10.76

Note1: The unit of Antenna Gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.
Note 2: Absolute Level=Submitted level-Cable loss+Antenna Gain
Margin=Limit-Absolute Level

Conducted emission – Transmitter mode (High power level)

Normal condition-Low Channel: 400.025 MHz

9kHz~150kHz



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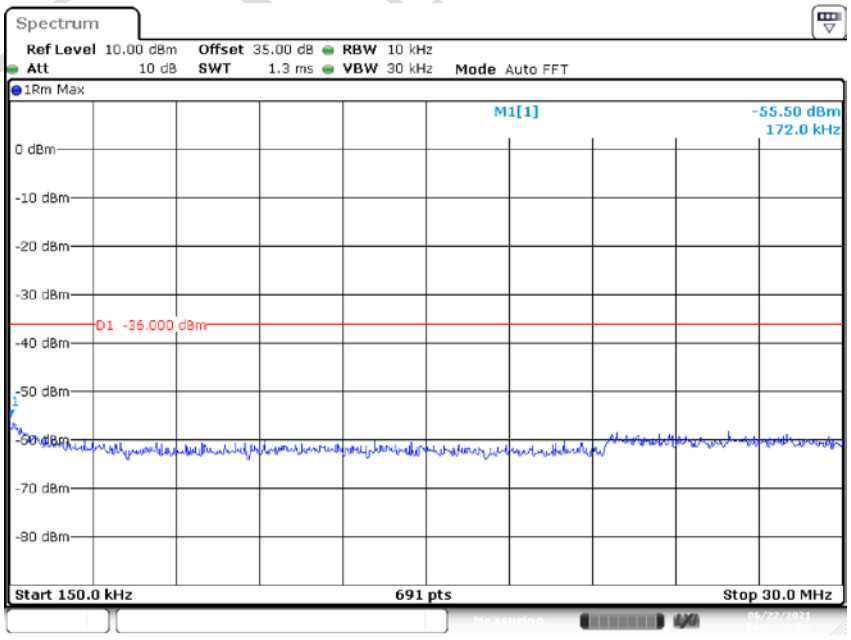
150kHz~30MHz



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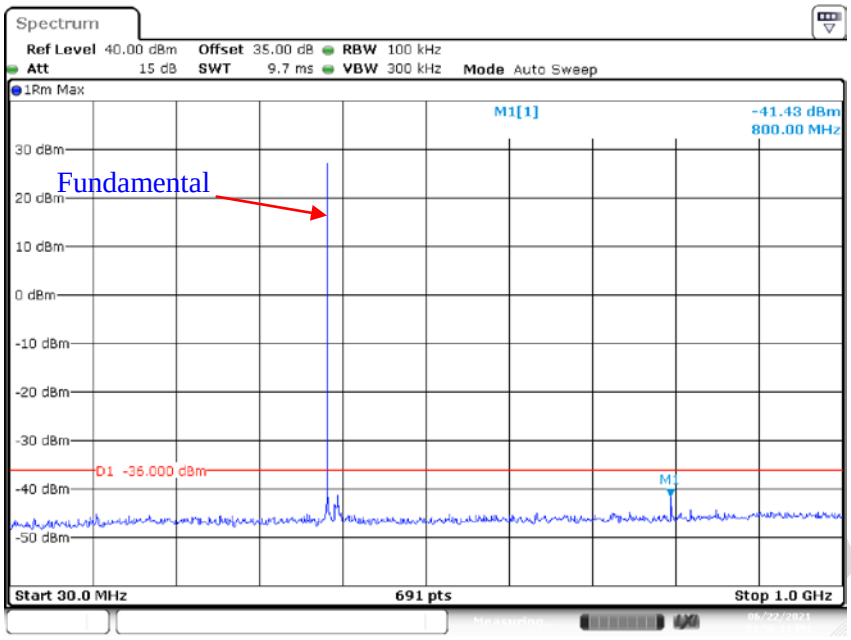
30MHz ~1GHz



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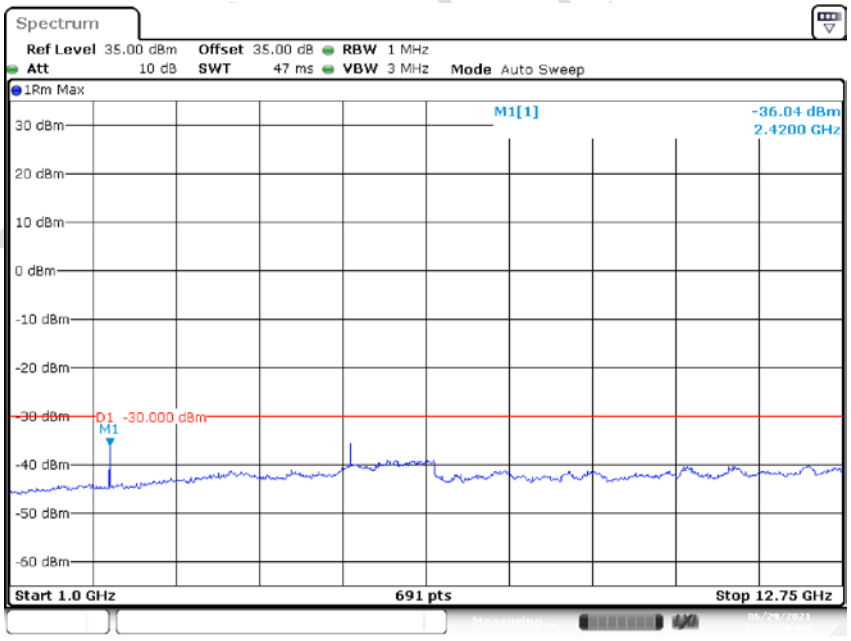
1GHz~12.75GHz



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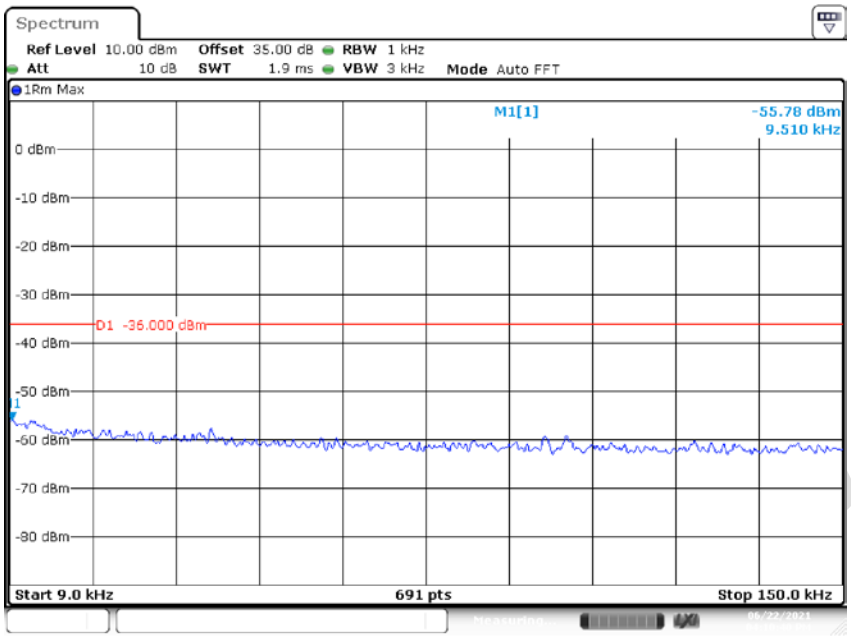
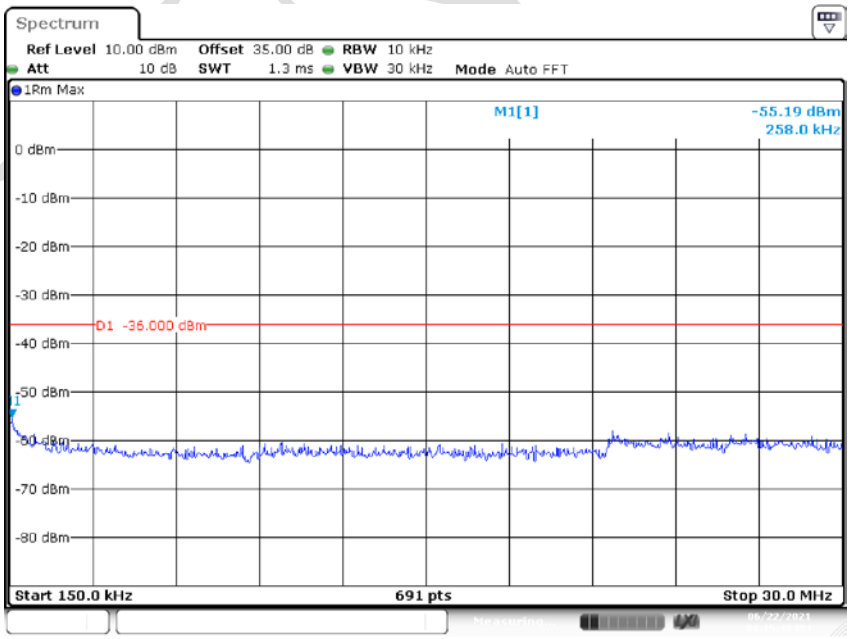
Normal condition-High Channel: 469.975 MHz

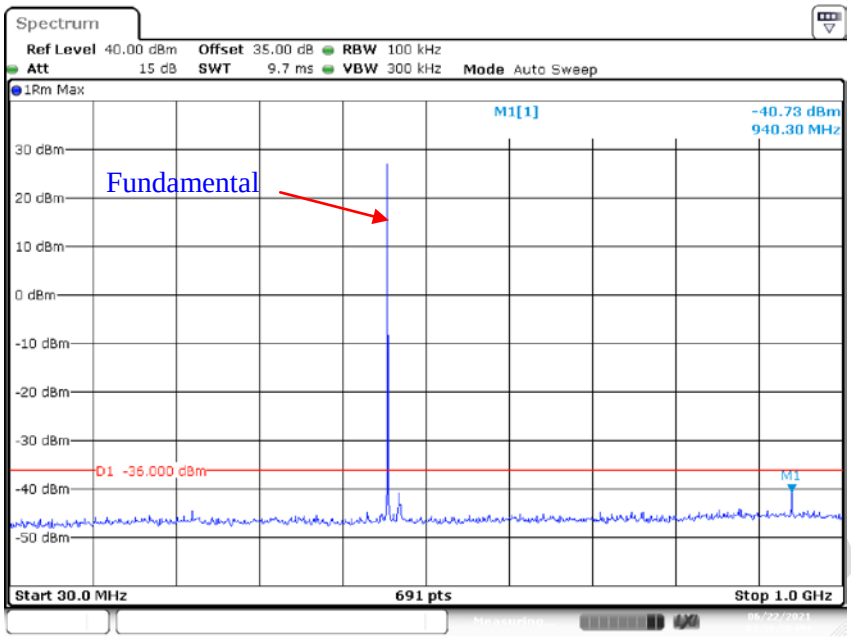
9kHz~150kHz



150kHz~30MHz



30MHz ~1GHz



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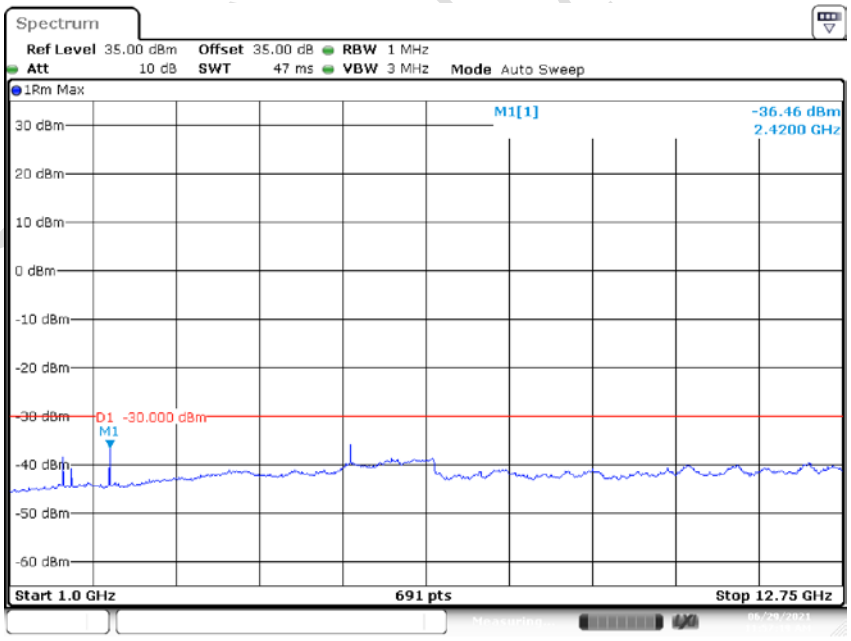
1GHz~12.75GHz



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ETSI EN 300 086 V2.1.2 (2016-08) §8.1 - MAXIMUM USABLE SENSITIVITY(CONDUCTED)

Applicable Standard

According to ETSI EN 300 086 V2.1.2 (2016-08) §8.1.1, the maximum usable sensitivity (conducted) of the receiver is the minimum level of signal (emf) at the receiver input, at the nominal frequency of the receiver and with normal test modulation which will produce:

- an audio frequency output power of at least 50 % of the rated power output; and
- a SND/ND ratio of 20 dB, measured at the receiver output through a telephone psophometric weighting network as described in ITU-T Recommendation O.41 [2] Red Book 1984.

Limits

The maximum usable sensitivity shall not exceed an electromotive force (emf) of +6,0 dBμV under normal test conditions, and an emf of +12,0 dBμV under extreme test conditions.

Method of measurement

The test signal, at the nominal frequency of the receiver, with normal test modulation, at an emf. of 6 dBμV, value of the limit for the maximum usable sensitivity, shall be applied to the receiver input connector.

An audio frequency output load, a SINAD metre and a psophometric telephone weighting network shall be connected to the receiver output terminals.

Where possible, the receiver volume control shall be adjusted to give at least 50 % of the rated output power, in the case of stepped volume controls, to the first step that provides an output power of at least 50 % of the rated output power.

The test signal input level shall be reduced until a SND/ND ratio of 20 dB is obtained.

The test signal input level under these conditions is the value of the maximum usable sensitivity.

The measurement shall be made under normal test conditions and repeated under extreme test conditions.

Under extreme test conditions, the receiver audio output power shall be within ±3,0 dB of the value obtained under normal test condition.

Test Data

Environmental Conditions

Temperature:	24.6 °C
Relative Humidity:	54 %
ATM Pressure:	101.2 kPa

The testing was performed by Stone Zhang on 2021-06-24.

Test Result: Compliant.

Test mode: Receiving (conducted)

Carrier Frequency: 400.025 MHz, Channel Spacing: 12.5 kHz

Test Conditions		Measured Sensitivity (dBµV)	Limit (dBµV)
Temperature (℃)	**Power Supply (V_{DC})**		
Tnor = +25	Vnor = 7.4	2.6	6 dBµV
Tmin = -30	Vmin =6.0	2.7	12dBµV
	Vmax =7.4	2.8	
Tmax = +40	Vmin =6.0	2.7	
	Vmax =7.4	2.5	

Carrier Frequency: 435.000 MHz, Channel Spacing: 12.5 kHz

Test Conditions		Measured Sensitivity (dBµV)	Limit (dBµV)
Temperature (℃)	**Power Supply (V_{DC})**		
Tnor = +25	Vnor = 7.4	2.7	6 dBµV
Tmin = -30	Vmin =6.0	2.8	12dBµV
	Vmax =7.4	2.7	
Tmax = +40	Vmin =6.0	2.9	
	Vmax =7.4	2.6	

Carrier Frequency: 469.975 MHz, Channel Spacing: 12.5 kHz

Test Conditions		Measured Sensitivity (dBµV)	Limit (dBµV)
Temperature (℃)	**Power Supply (V_{DC})**		
Tnor = +25	Vnor = 7.4	2.8	6 dBµV
Tmin = -30	Vmin =6.0	2.7	12dBµV
	Vmax =7.4	2.8	
Tmax = +40	Vmin =6.0	3.0	
	Vmax =7.4	2.9	

Carrier Frequency: 400.025 MHz, Channel Spacing: 25 kHz

Test Conditions		Measured Sensitivity (dBµV)	Limit (dBµV)
Temperature (℃)	**Power Supply (V_{DC})**		
Tnor = +25	Vnor = 7.4	2.8	6 dBµV
Tmin = -30	Vmin =6.0	2.7	12dBµV
	Vmax =7.4	2.9	
Tmax = +40	Vmin =6.0	2.7	
	Vmax =7.4	3.0	

Carrier Frequency: 435.000 MHz, Channel Spacing: 25 kHz

Test Conditions		Measured Sensitivity (dBµV)	Limit (dBµV)
Temperature (℃)	**Power Supply (V_{DC})**		
Tnor = +25	Vnor = 7.4	2.6	6 dBµV
Tmin = -30	Vmin =6.0	2.7	12dBµV
	Vmax =7.4	2.9	
Tmax = +40	Vmin =6.0	2.8	
	Vmax =7.4	2.6	

Carrier Frequency: 469.975 MHz, Channel Spacing: 25 kHz

Test Conditions		Measured Sensitivity (dBµV)	Limit (dBµV)
Temperature (℃)	**Power Supply (V_{DC})**		
Tnor = +25	Vnor = 7.4	2.9	6 dBµV
Tmin = -30	Vmin =6.0	2.7	12dBµV
	Vmax =7.4	2.6	
Tmax = +40	Vmin =6.0	2.8	
	Vmax =7.4	2.7	

ETSI EN 300 086 V2.1.2 (2016-08) §8.3 - CO-CHANNEL REJECTION

Applicable Standard

According to ETSI EN 300 086 V2.1.2 (2016-08) §8.3.1, the co-channel rejection is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due the presence of an unwanted modulated signal, both signals being at the nominal frequency of the receiver.

Limits

The value of the co-channel rejection ratio, expressed in dB, at the signal displacements given in the method of measurement, shall be:

- between -8,0 dB and 0 dB, for channel separations of 20 kHz and 25 kHz;
- between -12,0 dB and 0 dB, for channel separations of 12,5 kHz.

Method of measurement

The two input signals shall be connected to the receiver via a combining network.

The wanted test signal, at the nominal frequency of the receiver, with normal test modulation at an e.m.f. of 6 dBμV, value of the limit for the maximum usable sensitivity, shall be applied to the receiver input connector via one input of the combining network.

The unwanted test signal, at the nominal frequency of the receiver, modulated with a frequency of 400 Hz at a deviation of 60 % of the maximum permissible frequency deviation, clause 7.4.3.1 shall be applied to the receiver input connector via the second input of the combining network.
The amplitude of the unwanted test signal shall be adjusted until the SND/ND ratio, psophometrically weighted, at the output of the receiver is reduced to 14 dB.

The measure of the co-channel rejection is the ratio in dB of the level of the unwanted test signal to the level of the wanted test signal at the receiver input for which the specified reduction in SND/ND ratio occurs.
This ratio shall be recorded.

The measurement shall be repeated for displacements of the unwanted test signal of ±1 500 Hz and ±3 000 Hz.

The lowest value of the five measurement results recorded shall be recorded as the co-channel rejection.

Test Data

Environmental Conditions

Temperature:	24.6 °C
Relative Humidity:	54 %
ATM Pressure:	101.2 kPa

The testing was performed by Stone Zhang on 2021-06-24.

Test Result: Compliant.

Test Mode: Receiving (conducted)

Carrier Frequency: 400.025 MHz, Channel Spacing: 12.5 kHz

Test Condition		Measurement Offset (kHz)	Measured Value (dB)	Limit(dB)
Temperature	Voltage			
25℃	7.4V	-3	-7	-12≤Limit≤0
		-1.5	-6	
		0	-5	
		1.5	-6	
		3	-7	

Carrier Frequency: 435.000 MHz, Channel Spacing: 12.5 kHz

Test Condition		Measurement Offset (kHz)	Measured Value (dB)	Limit(dB)
Temperature	Voltage			
25℃	7.4V	-3	-6	-12≤Limit≤0
		-1.5	-5	
		0	-6	
		1.5	-7	
		3	-6	

Carrier Frequency: 469.975 MHz, Channel Spacing: 12.5 kHz

Test Condition		Measurement Offset (kHz)	Measured Value (dB)	Limit(dB)
Temperature	Voltage			
25℃	7.4V	-3	-7	-12≤Limit≤0
		-1.5	-5	
		0	-7	
		1.5	-6	
		3	-5	

Carrier Frequency: 400.025 MHz, Channel Spacing: 25 kHz

Test Condition		Measurement Offset (kHz)	Measured Value (dB)	Limit(dB)
Temperature	Voltage			
25℃	7.4V	-3	-6	-8≤Limit≤0
		-1.5	-7	
		0	-5	
		1.5	-7	
		3	-6	

Carrier Frequency: 435.000 MHz, Channel Spacing: 25 kHz

Test Condition		Measurement Offset (kHz)	Measured Value (dB)	Limit(dB)
Temperature	Voltage			
25℃	7.4V	-3	-6	-8≤Limit≤0
		-1.5	-5	
		0	-6	
		1.5	-5	
		3	-7	

Carrier Frequency: 469.975 MHz, Channel Spacing: 25 kHz

Test Condition		Measurement Offset (kHz)	Measured Value (dB)	Limit(dB)
Temperature	Voltage			
25℃	7.4V	-3	-6	-8≤Limit≤0
		-1.5	-7	
		0	-6	
		1.5	-5	
		3	-7	

ETSI EN 300 086 V2.1.2 (2016-08) §8.4 - ADJACENT CHANNEL SELECTIVITY

Applicable Standard

According to ETSI EN 300 086 V2.1.2 (2016-08) §8.4.1, the adjacent channel selectivity is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted signal which differs in frequency from the wanted signal by an amount equal to the adjacent channel separation for which the equipment is intended.

Limits

The adjacent channel selectivity for different channel separations shall not be less than the values given in following table.

Test Conditions	Channel Separation	
	12.5 kHz	20/25 kHz
Normal Test Conditions	60.0 dB	70.0 dB
Extreme Test Conditions	50.0 dB	60.0 dB

Method of measurement

The two input signals shall be connected to the receiver via a combining network.

The wanted test signal, at the nominal frequency of the receiver, with normal test modulation at an e.m.f. of 6 dBµV, value of the limit for the maximum usable sensitivity, shall be applied to the receiver input connector via one input of the combining network.

The unwanted test signal, at the frequency of one channel separation above the nominal frequency of the receiver, modulated with a frequency of 400 Hz at a deviation of 60 % of the maximum permissible frequency deviation, clause 7.4.3.1, shall be applied to the receiver input connector via the second input of the combining network.

The amplitude of the unwanted test signal shall be adjusted until the SND/ND ratio, psophometrically weighted, at the output of the receiver is reduced to 14 dB.

The measure of the adjacent channel selectivity is the ratio in dB of the level of the unwanted test signal to the level of the wanted test signal at the receiver input for which the specified reduction in SND/ND ratio occurs.

This ratio shall be recorded.

The measurement shall be repeated with an unwanted signal at the frequency of the channel below that of the wanted signal.

The two noted ratios shall be recorded as the upper and lower adjacent channel selectivity.

The measurements shall be repeated under extreme test conditions with the amplitude of the wanted test signal adjusted to an emf of 12 dBµV.

Test Data

Environmental Conditions

Temperature:	24.6 °C
Relative Humidity:	54 %
ATM Pressure:	101.2 kPa

The testing was performed by Stone Zhang on 2021-06-24.

Test Result: Compliant.

Test Mode: Receiving

Carrier Frequency: 400.025 MHz, Channel Spacing: 12.5 kHz

Test Conditions		Measured Channel (dB)	Measured Result (dB)	Limit (dB)
Temperature (℃)	**Power Supply (V_{DC})**			
Tnor = +25	Vnor = 7.4	Upper Channel	66	60
		Lower Channel	64	
Tmin = -30	Vmin = 6.0	Upper Channel	67	50
		Lower Channel	66	
	Vmax = 7.4	Upper Channel	65	
		Lower Channel	66	
Tmax = +40	Vmin = 6.0	Upper Channel	68	
		Lower Channel	65	
	Vmax = 7.4	Upper Channel	65	
		Lower Channel	67	

Carrier Frequency: 435.000 MHz, Channel Spacing: 12.5 kHz

Test Conditions		Measured Channel (dB)	Measured Result (dB)	Limit (dB)
Temperature (℃)	**Power Supply (V_{DC})**			
Tnor = +25	Vnor = 7.4	Upper Channel	66	60
		Lower Channel	65	
Tmin = -30	Vmin = 6.0	Upper Channel	67	50
		Lower Channel	65	
	Vmax = 7.4	Upper Channel	68	
		Lower Channel	64	
Tmax = +40	Vmin = 6.0	Upper Channel	67	
		Lower Channel	69	
	Vmax = 7.4	Upper Channel	66	
		Lower Channel	68	

Carrier Frequency: 469.975 MHz, Channel Spacing: 12.5 kHz

Test Conditions		Measured Channel (dB)	Measured Result (dB)	Limit (dB)
Temperature (℃)	Power Supply (V_{DC})			
Tnor = +25	Vnor = 7.4	Upper Channel	67	60
		Lower Channel	65	
Tmin = -30	Vmin = 6.0	Upper Channel	64	50
		Lower Channel	66	
	Vmax = 7.4	Upper Channel	65	
		Lower Channel	67	
Tmax = +40	Vmin = 6.0	Upper Channel	66	
		Lower Channel	67	
	Vmax = 7.4	Upper Channel	68	
		Lower Channel	65	

Carrier Frequency: 400.025 MHz, Channel Spacing: 25 kHz

Test Conditions		Measured Channel (dB)	Measured Result (dB)	Limit (dB)
Temperature (℃)	Power Supply (V_{DC})			
Tnor = +25	Vnor = 7.4	Upper Channel	76	70
		Lower Channel	77	
Tmin = -30	Vmin = 6.0	Upper Channel	73	60
		Lower Channel	74	
	Vmax = 7.4	Upper Channel	75	
		Lower Channel	77	
Tmax = +40	Vmin = 6.0	Upper Channel	76	
		Lower Channel	74	
	Vmax = 7.4	Upper Channel	76	
		Lower Channel	75	

Carrier Frequency: 435.000 MHz, Channel Spacing: 25 kHz

Test Conditions		Measured Channel (dB)	Measured Result (dB)	Limit (dB)
Temperature (℃)	Power Supply (V_{DC})			
Tnor = +25	Vnor = 7.4	Upper Channel	75	70
		Lower Channel	77	
Tmin = -30	Vmin = 6.0	Upper Channel	74	60
		Lower Channel	74	
	Vmax = 7.4	Upper Channel	77	
		Lower Channel	74	
Tmax = +40	Vmin = 6.0	Upper Channel	77	
		Lower Channel	75	
	Vmax = 7.4	Upper Channel	76	
		Lower Channel	77	

Carrier Frequency: 469.975 MHz, Channel Spacing: 25 kHz

Test Conditions		Measured Channel (dB)	Measured Result (dB)	Limit (dB)
Temperature (℃)	Power Supply (V_{DC})			
Tnor = +25	Vnor = 7.4	Upper Channel	74	70
		Lower Channel	74	
Tmin = -30	Vmin = 6.0	Upper Channel	76	60
		Lower Channel	76	
	Vmax = 7.4	Upper Channel	76	
		Lower Channel	74	
Tmax = +40	Vmin = 6.0	Upper Channel	77	
		Lower Channel	77	
	Vmax = 7.4	Upper Channel	75	
		Lower Channel	75	

ETSI EN 300 086 V2.1.2 (2016-08) §8.5 - SPURIOUS RESPONSE REJECTION

Applicable Standard

According to ETSI EN 300 086 V2.1.2 (2016-08) §8.5.1, the spurious response rejection is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted modulated signal at any other frequency, at which a response is obtained.

Limits

At any frequency separated from the nominal frequency of the receiver by two channels or more, the spurious response rejection shall not be less than 70,0 dB.

Method of measurement

Method of search over the "limited frequency range":

The two input signals shall be connected to the receiver via a combining network.

The wanted test signal, at the nominal frequency of the receiver, with normal test modulation at an e.m.f. of 6 dBµV, value of the limit for the maximum usable sensitivity, shall be applied to the receiver input connector via one input of the combining network.

The unwanted test signal, modulated with a frequency of 400 Hz at a deviation of 60 % of the maximum permissible frequency deviation, clause 7.4.3.1, at an emf of 86 dBµV, shall be applied to the receiver input connector via the second input of the combining network.

The frequency of the unwanted signal shall be varied incrementally over the "limited frequency range".

The incremental steps of the frequency of the unwanted signal shall be 5 kHz.

The frequency of any spurious response detected during the search shall be recorded for the use in measurements in accordance with clause 8.5.3.2.

Method of measurement - Step 2

The two input signals shall be connected to the receiver via a combining network.

The wanted test signal, at the nominal frequency of the receiver, with normal test modulation at an e.m.f. of 6 dBµV, value of the limit for the maximum usable sensitivity, shall be applied to the receiver input connector via one input of the combining network.

The unwanted test signal, modulated with a frequency of 400 Hz at a deviation of 60 % of the maximum permissible frequency deviation, clause 7.4.3.1, at an emf of 86 dBµV, shall be applied to the receiver input connector via the second input of the combining network.

The measurement shall be performed at all spurious response frequencies found during the search over the "limited frequency range" and at frequencies calculated for the remainder of the spurious response frequencies in the frequency range 100 kHz to 2 GHz for equipment operating on frequencies below 470 MHz, or in the frequency range of 100 kHz to 4 GHz for equipment operating on frequencies above 470 MHz.

At each frequency at which a spurious response occurs, the input level shall be adjusted until the SND/ND ratio, psophometrically weighted, is reduced to 14 dB.

The measure of the spurious response rejection is the ratio in dB of the level of the unwanted test signal to the level of the wanted test signal at the receiver input for which the specified reduction in SND/ND ratio occurs.

The ratio shall be recorded as the spurious response rejection for each spurious response obtained.

Test Data

Environmental Conditions

Temperature:	24.6 °C
Relative Humidity:	54 %
ATM Pressure:	101.2 kPa

The testing was performed by Stone Zhang on 2021-06-24.

Test Result: Compliant.

Test Mode: Receiving

Channel Separation	Carrier Frequency (MHz)	Measured Result (dB)	Limit (dB)
12.5kHz	400.025	80	70
	435.000	81	70
	469.975	78	70
25kHz	400.025	79	70
	435.000	81	70
	469.975	80	70

ETSI EN 300 086 V2.1.2 (2016-08) §8.6 - INTERMODULATION RESPONSE REJECTION

Applicable Standard

According to ETSI EN 300 086 V2.1.2 (2016-08) §8.6.1, the intermodulation response rejection is a measure of the capability of the receiver to receive a wanted modulated signal, without exceeding a given degradation due to the presence of two or more unwanted signals with a specific frequency relationship to the wanted signal frequency.

Limits

The intermodulation response rejection ratio shall not be less than 70,0 dB for base station equipment and 65,0 dB for mobile and hand portable equipment.

Method of measurement

Three input signals shall be connected to the receiver via a combining network.

The wanted test signal (A), at the nominal frequency of the receiver, with normal test modulation at a deviation of 60 % of the maximum permissible frequency deviation (see clause 7.4.3.1) at an emf of 6 dBμV, value of the limit for the maximum usable sensitivity, shall be applied to the receiver input connector via one input of the combining network.

The unwanted test signal (B), at the frequency 25 kHz above the nominal frequency of the receiver, without modulation, shall be applied to the receiver input connector via the second input of the combining network.

The unwanted test signal (C), at the frequency 50 kHz above the nominal frequency of the receiver, modulated with a frequency of 400 Hz at a deviation of 60 % of the maximum permissible frequency deviation (see clause 7.4.3.1) shall be applied to the receiver input connector via the third input of the combining network.

The amplitude of the unwanted test signals (B) and (C) shall be maintained equal and adjusted until the SND/ND ratio, psophometrically weighted, at the output of the receiver is reduced to 14 dB.

The measure of the intermodulation response rejection is the ratio in dB of the level of the unwanted test signals to the level of the wanted test signal at the receiver input for which the specified reduction in SND/ND ratio occurs.

This ratio shall be recorded.

The measurement shall be repeated with the unwanted signal from signal generator (B) at a frequency 50 kHz above the wanted signal and with the unwanted signal from signal generator (C) at a frequency 100 kHz above the wanted signal.

The two sets of measurements described above shall be repeated with the unwanted signals below the nominal frequency of the receiver by the specified amounts.

Test Data

Environmental Conditions

Temperature:	24.6 °C
Relative Humidity:	54 %
ATM Pressure:	101.2 kPa

The testing was performed by Stone Zhang on 2021-06-24.

Test Result: Compliant.

Test Mode: Receiving

Channel Separation	Carrier Frequency (MHz)	Measured Result (dB)	Limit (dB)
12.5kHz	400.025	78	65
	435.000	76	65
	469.975	76	65
25kHz	400.025	75	65
	435.000	74	65
	469.975	79	65

ETSI EN 300 086 V2.1.2 (2016-08) §8.7 - BLOCKING OR DESENSITIZATION

Applicable Standard

According to ETSI EN 300 086 V2.1.2 (2016-08) §8.7.1, Blocking is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted input signal at any frequencies other than those of the spurious responses or the adjacent channels

Limits

The blocking ratio for any frequency within the specified ranges shall not be less than 84,0 dB, except at frequencies on which spurious responses are found.

Method of measurement

The two input signals shall be connected to the receiver via a combining network.

The wanted test signal, at the nominal frequency of the receiver, with normal test modulation, at an emf of 6 dBµV, value of the limit for the maximum usable sensitivity, shall be applied to the receiver input connector via one input of the combining network.

Where possible, the receiver volume control shall be adjusted to give at least 50 % of the rated output power or, in the case of stepped volume controls, to the first step that provides an output power of at least 50 % of the rated output power.

The obtained audio output level shall be noted.

The unwanted test signal, at a frequency from 1 MHz to 10 MHz offset from the nominal frequency of the receiver, without modulation, shall be applied to the receiver input connector via the second input of the combining network.

For practical reasons the measurements will be carried out at frequencies of the unwanted signal at approximately ±1 MHz, ±2 MHz, ±5 MHz and ±10 MHz.

The amplitude of the unwanted test signal shall be adjusted until:

- a reduction of 3 dB in the audio output level of the wanted signal; or
- the SND/ND ratio, psophometrically weighted, at the output of the receiver is reduced to 14 dB;

whichever occurs first. This level shall be noted.

The measure of the blocking or desensitization is the ratio in dB of the level of the unwanted test signal to the level of the wanted test signal at the receiver input for which the specified reduction in audio output level or in the SND/ND ratio occurs.

This ratio shall be recorded for each of the eight noted levels as the blocking or desensitization.

Test Data

Environmental Conditions

Temperature:	24.6 °C
Relative Humidity:	54 %
ATM Pressure:	101.2 kPa

The testing was performed by Stone Zhang on 2021-06-24.

Test Result: Compliant.

Test Mode: Receiving

Carrier Frequency: 400.025 MHz, Channel Spacing: 12.5 kHz

Carrier Frequency (MHz)	Frequency offset (MHz)	Measured Result (dB)	Limit (dB)
400.025	-10	93	⩾84.0
	-5	92	
	-2	91	
	-1	90	
	10	91	
	5	92	
	2	91	
	1	90	

Carrier Frequency: 435.000 MHz, Channel Spacing: 12.5 kHz

Carrier Frequency (MHz)	Frequency offset (MHz)	Measured Result (dB)	Limit (dB)
435.000	-10	91	⩾84.0
	-5	92	
	-2	90	
	-1	92	
	10	93	
	5	92	
	2	91	
	1	90	

Carrier Frequency: 469.975 MHz, Channel Spacing: 12.5 kHz

Carrier Frequency (MHz)	Frequency offset (MHz)	Measured Result (dB)	Limit (dB)
469.975	-10	92	⩾84.0
	-5	93	
	-2	90	
	-1	91	
	10	92	
	5	90	
	2	92	
	1	93	

Carrier Frequency: 400.025 MHz, Channel Spacing: 25 kHz

Carrier Frequency (MHz)	Frequency offset (MHz)	Measured Result (dB)	Limit (dB)
400.025	-10	92	⩾84.0
	-5	93	
	-2	91	
	-1	92	
	10	90	
	5	90	
	2	92	
	1	91	

Carrier Frequency: 435.000 MHz, Channel Spacing: 25 kHz

Carrier Frequency (MHz)	Frequency offset (MHz)	Measured Result (dB)	Limit (dB)
435.000	-10	92	⩾84.0
	-5	90	
	-2	91	
	-1	93	
	10	91	
	5	90	
	2	92	
	1	91	

Carrier Frequency: 469.975 MHz, Channel Spacing: 25 kHz

Carrier Frequency (MHz)	Frequency offset (MHz)	Measured Result (dB)	Limit (dB)
469.975	-10	92	⩾84.0
	-5	93	
	-2	90	
	-1	91	
	10	90	
	5	93	
	2	92	
	1	91	

ETSI EN 300 086 V2.1.2 (2016-08) §8.8 – RECEIVER SPURIOUS RADIATIONS

Standard Applicable

According to ETSI EN 300 086 V2.1.2 (2016-08) §8.8.1, Spurious radiations from the receiver are emissions at any frequency, radiated by the equipment and its antenna.

The level of spurious radiations shall be measured by:
either:
a) their power level in a specified load (conducted spurious emission); and
b) their effective radiated power when radiated by the cabinet and structure of the equipment (cabinet radiation); or
c) their effective radiated power when radiated by the cabinet and by the integral antenna, in the case of hand portable equipment fitted with such an antenna and no external RF connector.

NOTE: i.e. ((a and b) or c).

Method of Measurement

According to ETSI EN 300 086 V2.1.2 (2016-08) §8.8

Test Data

Environmental Conditions

Temperature:	24.6~24.9 °C
Relative Humidity:	54 ~55 %
ATM Pressure:	101.2~101.3 kPa

The testing was performed by Stone Zhang from 2021-06-22 to 2021-06-29.

Test Result: Compliant

Radiated emission - Receiver mode

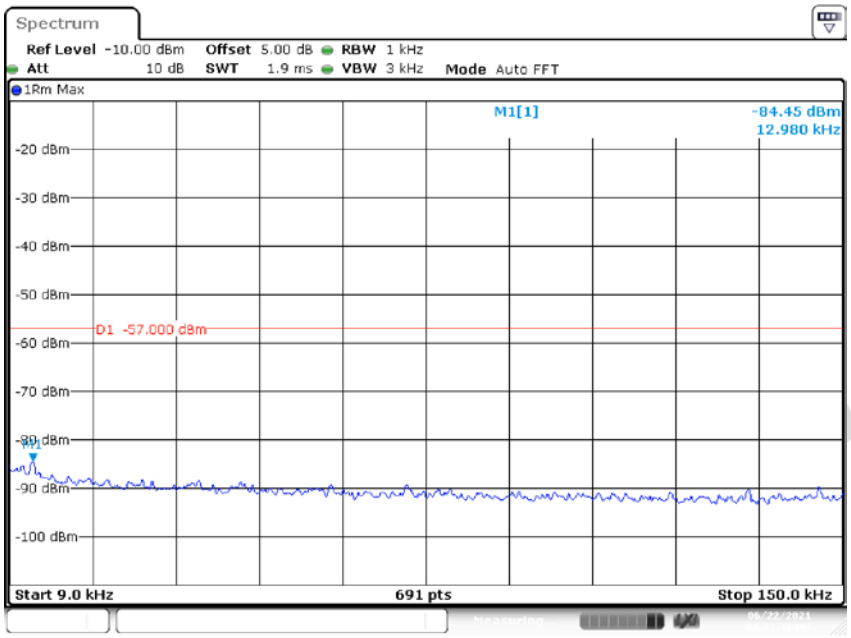
Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	EN 300 086	
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
Low Channel-400.025 MHz										
693.81	37.74	305	150	H	-61.91	0.62	-1.68	-64.21	-57	7.21
693.81	38.16	184	150	V	-61.49	0.62	-1.68	-63.79	-57	6.79
1598.75	46.96	304	150	H	-66.74	0.83	8.36	-59.21	-47	12.21
1598.75	47.40	83	150	V	-66.30	0.83	8.36	-58.77	-47	11.77
High Channel-469.975 MHz										
693.89	37.63	56	150	H	-62.02	0.62	-1.68	-64.32	-57	7.32
693.89	38.30	146	150	V	-61.35	0.62	-1.68	-63.65	-57	6.65
1599.25	46.79	310	150	H	-66.91	0.83	8.36	-59.38	-47	12.38
1599.25	47.56	150	150	V	-66.14	0.83	8.36	-58.61	-47	11.61

Note1: The unit of Antenna Gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.
Note 2: Absolute Level=Submitted level-Cable loss+Antenna Gain
Margin=Limit-Absolute Level

Conducted emission – Receiver mode(worst case)

Normal condition-Low Channel: 400.025 MHz

9kHz~150kHz



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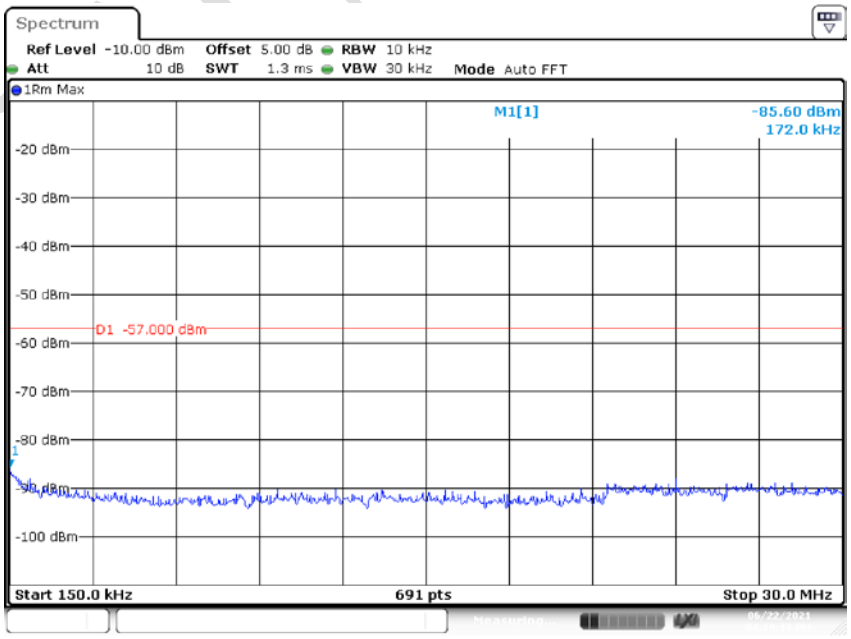
150kHz~30MHz



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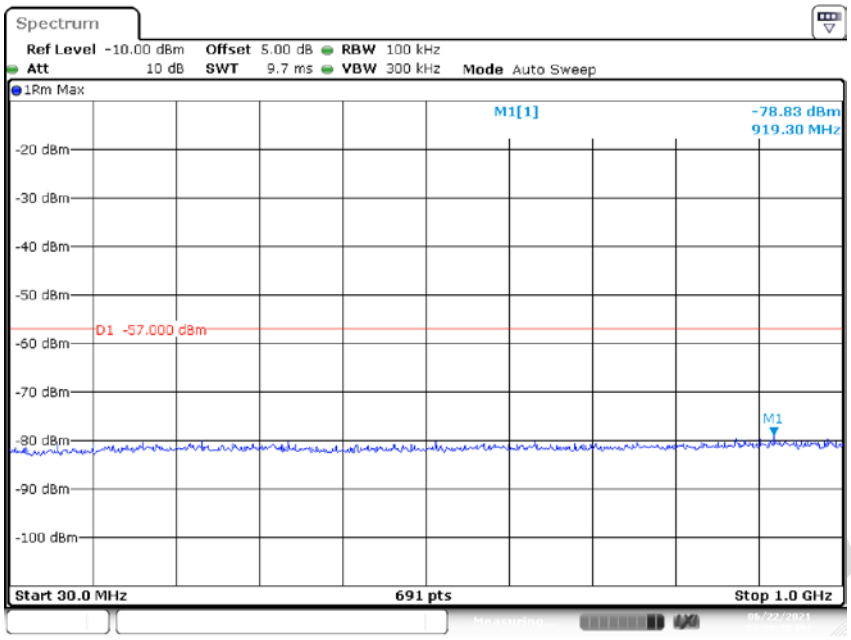
30MHz ~1GHz



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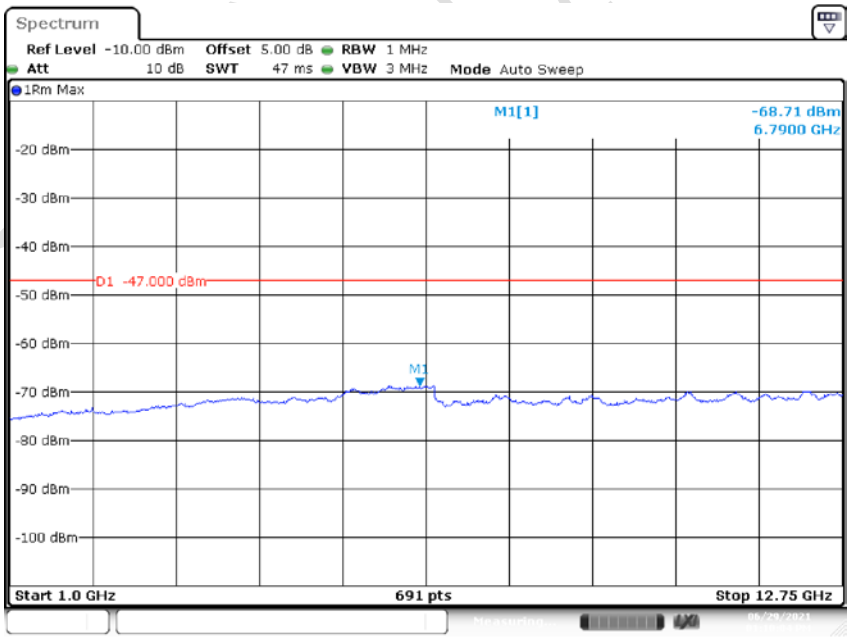
1GHz~12.75GHz



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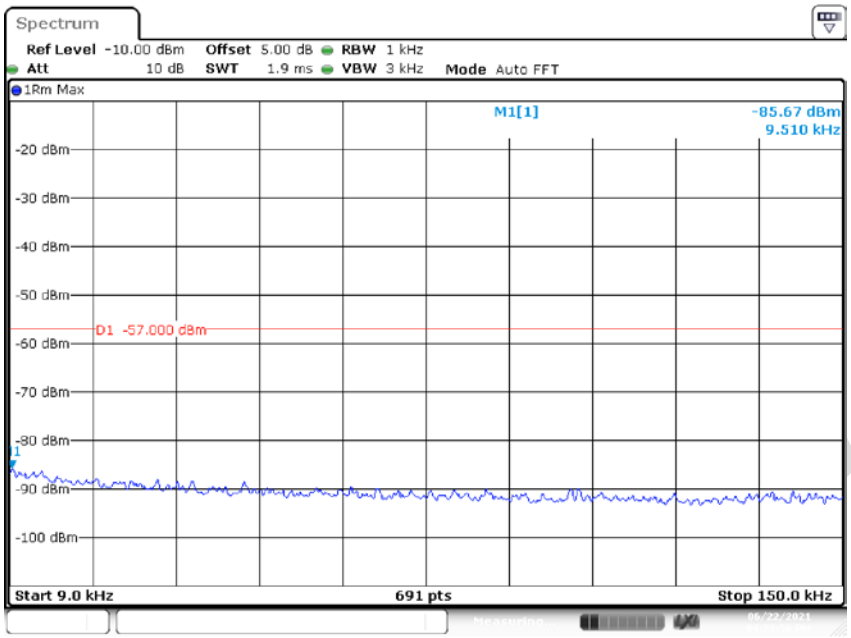
Normal condition-Middle Channel: 435.000 MHz

9kHz~150kHz



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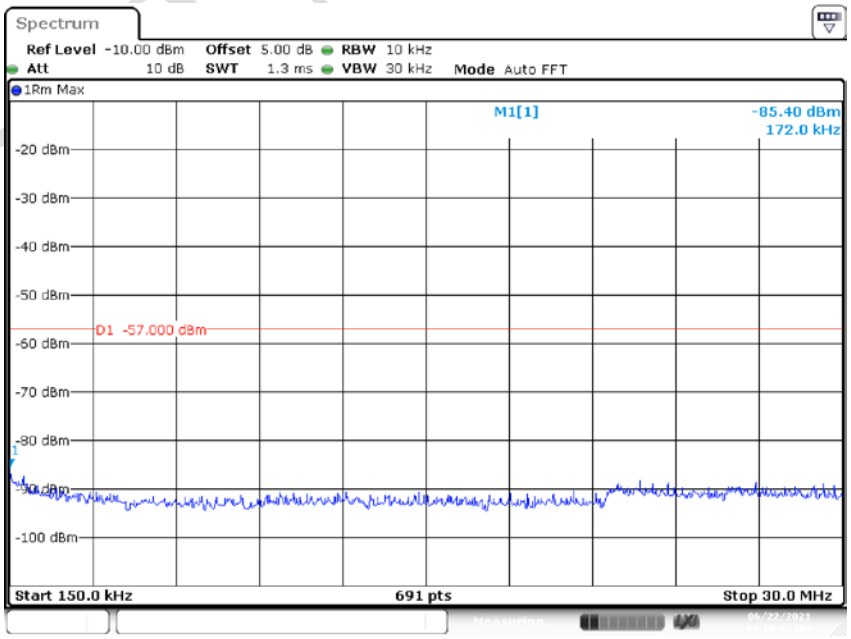
150kHz~30MHz



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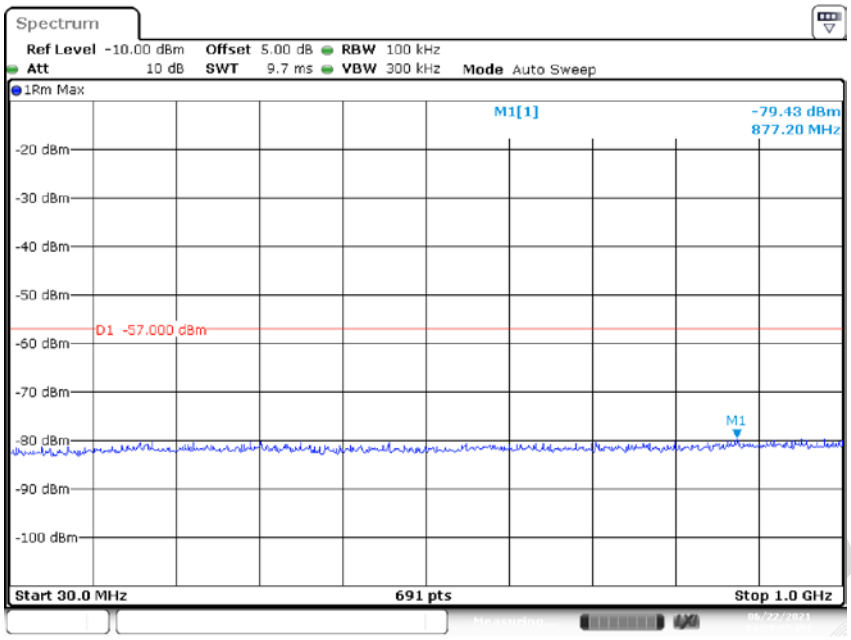
30MHz ~1GHz



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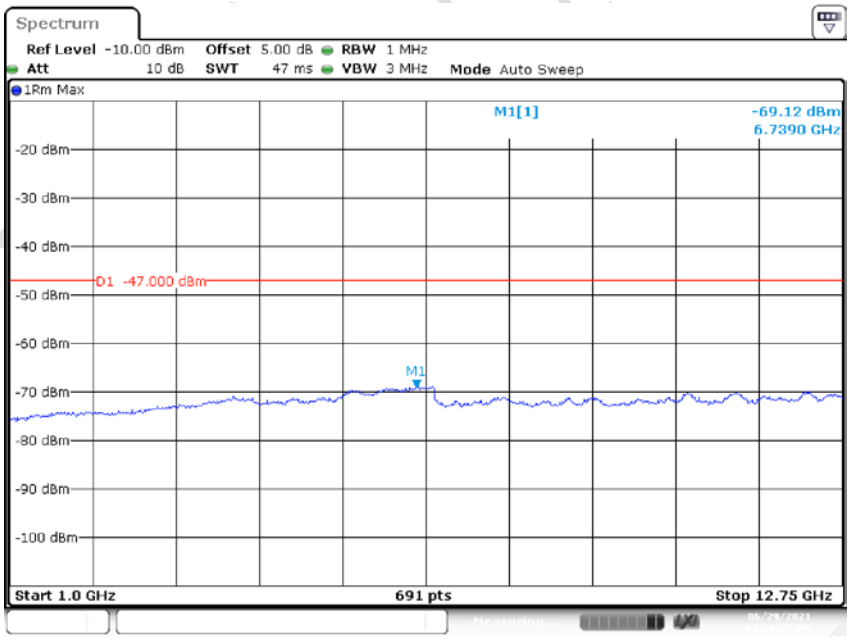
1GHz~12.75GHz



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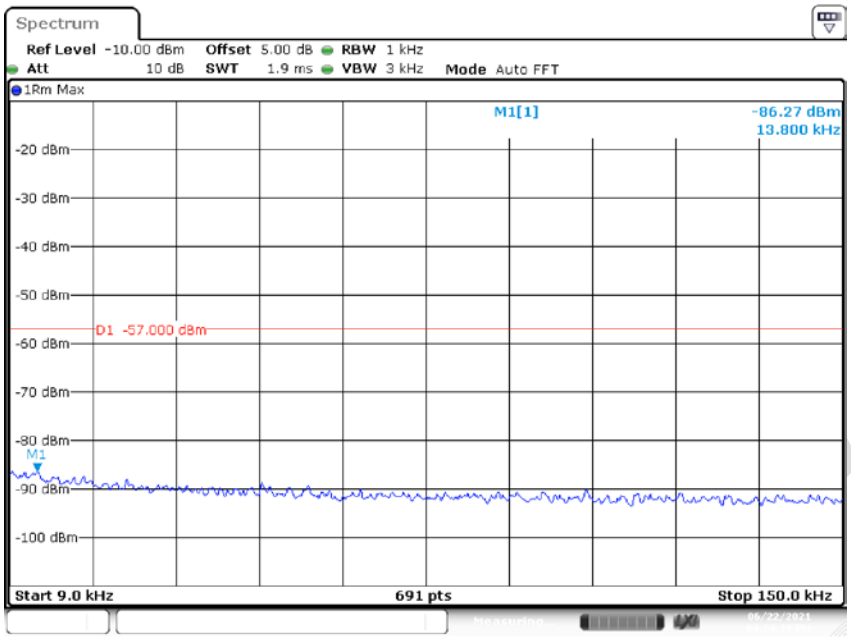
Normal condition-Middle Channel: 469.975 MHz

9kHz~150kHz



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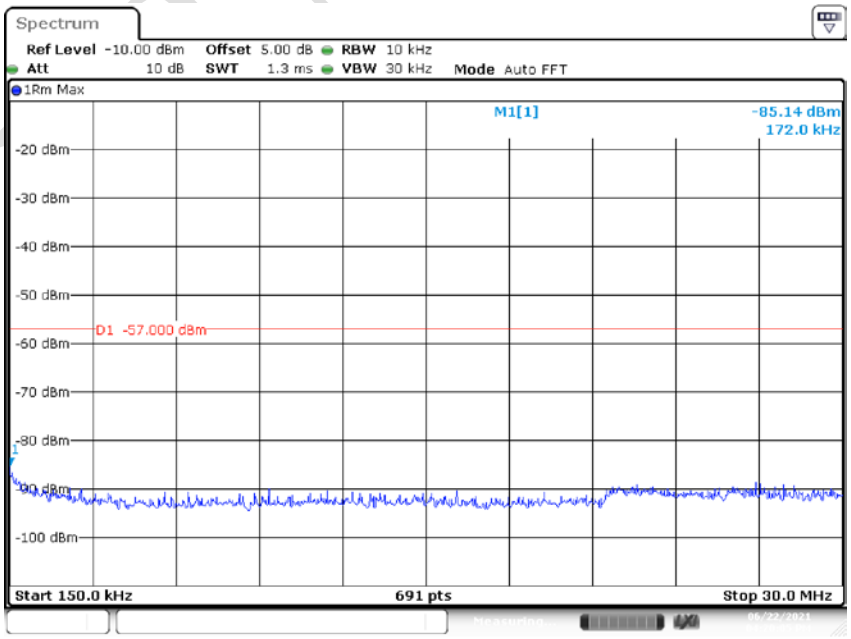
150kHz~30MHz



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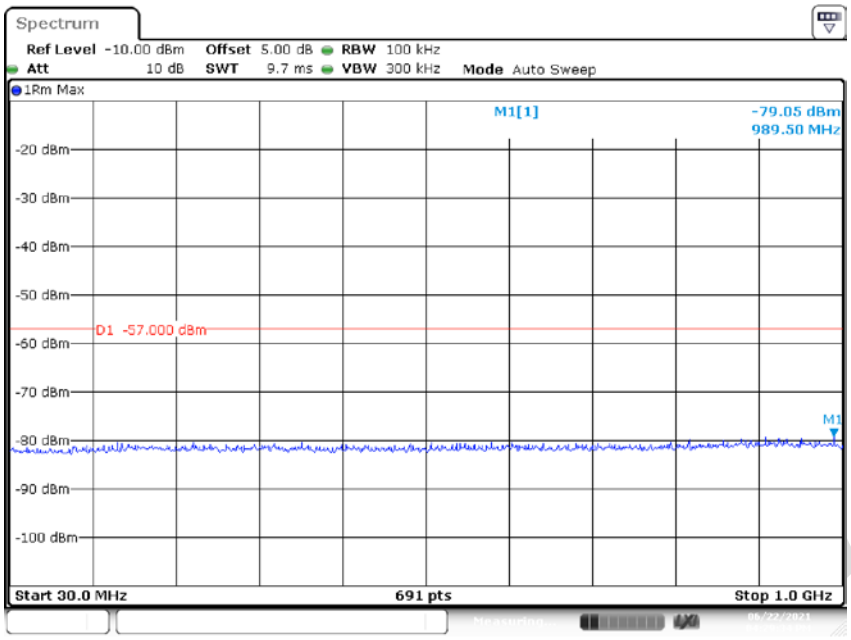
30MHz ~1GHz



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1GHz~12.75GHz

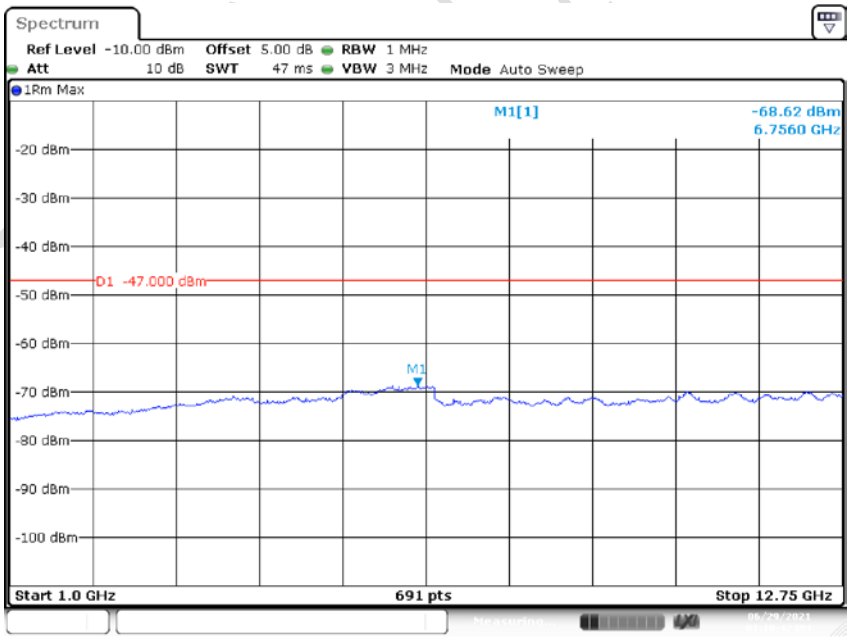

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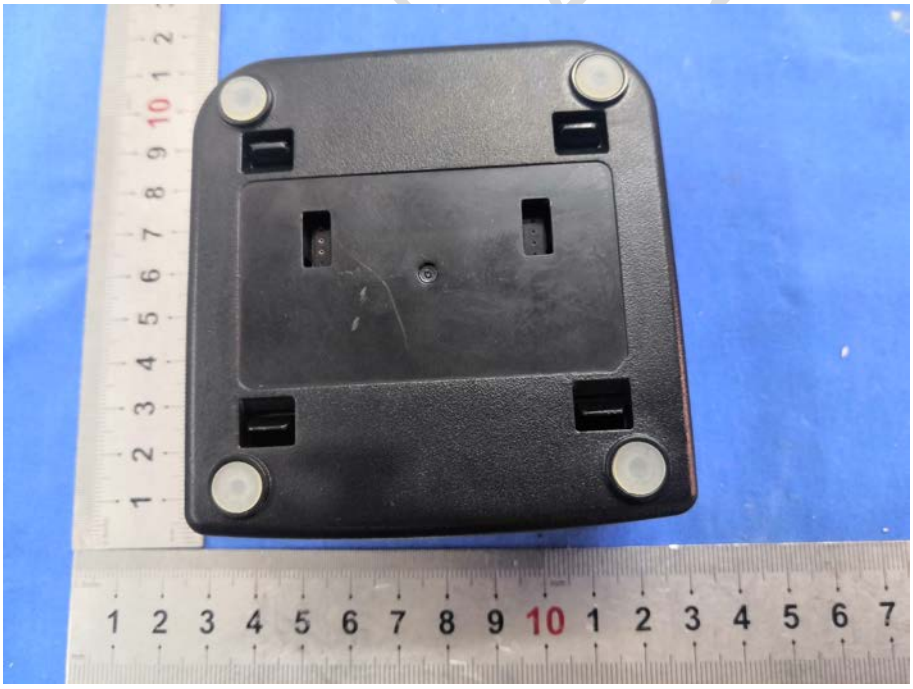
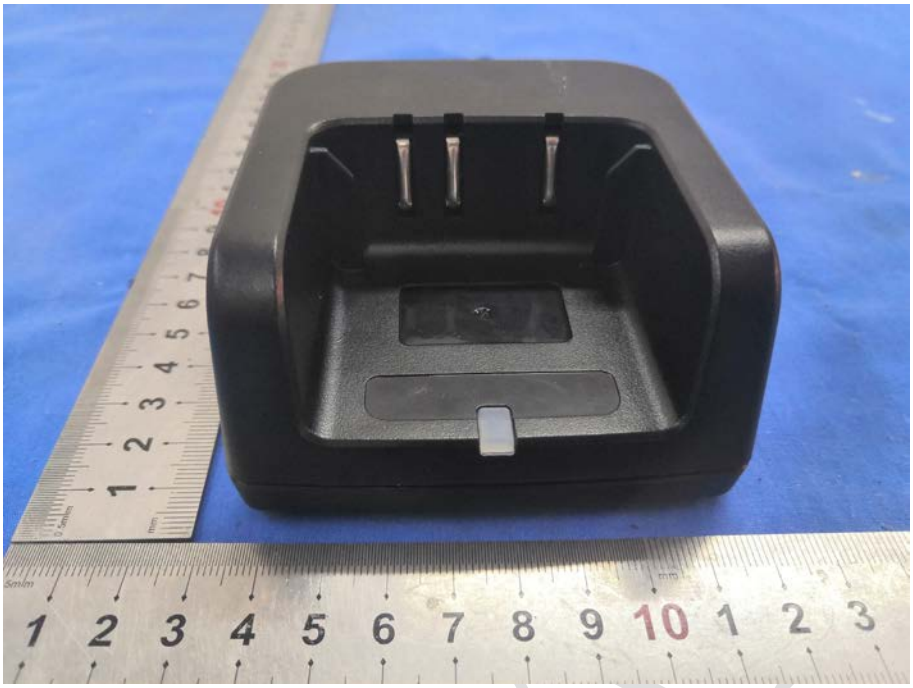
EXHIBIT A - EUT PHOTOGRAPHS

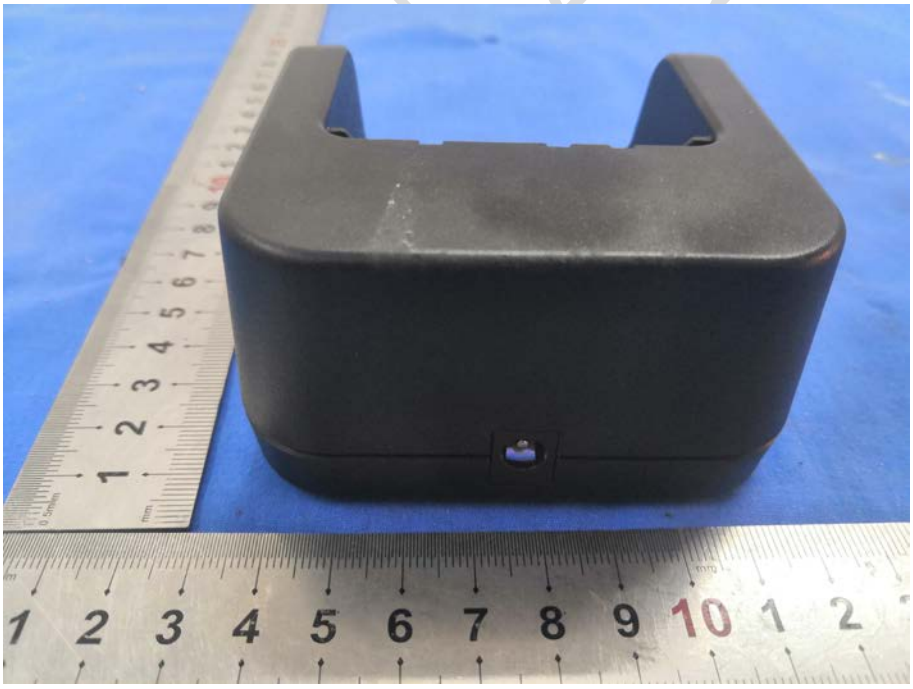

Talkpod

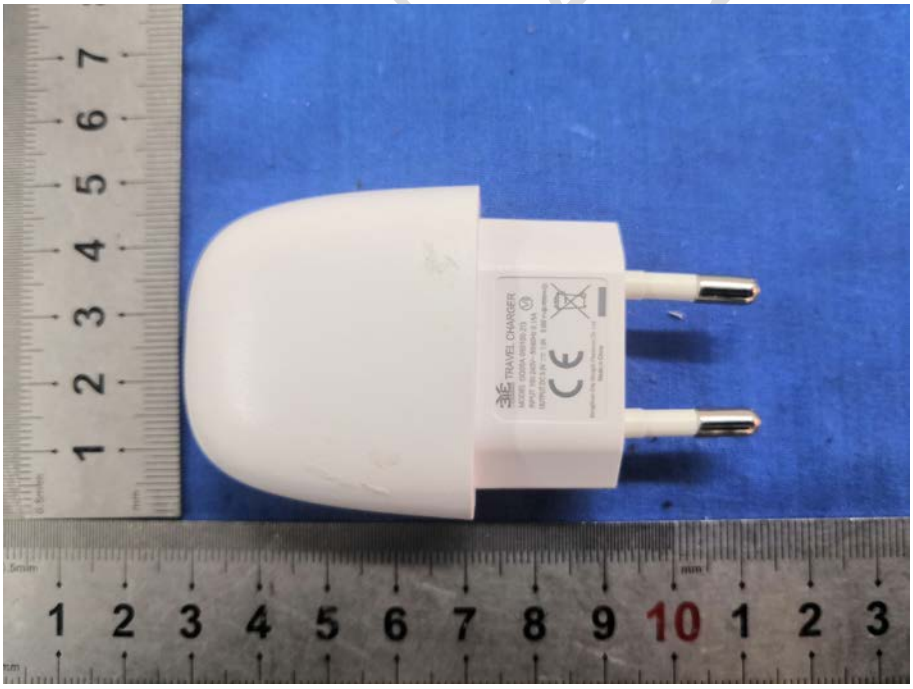

Talkpod


D30



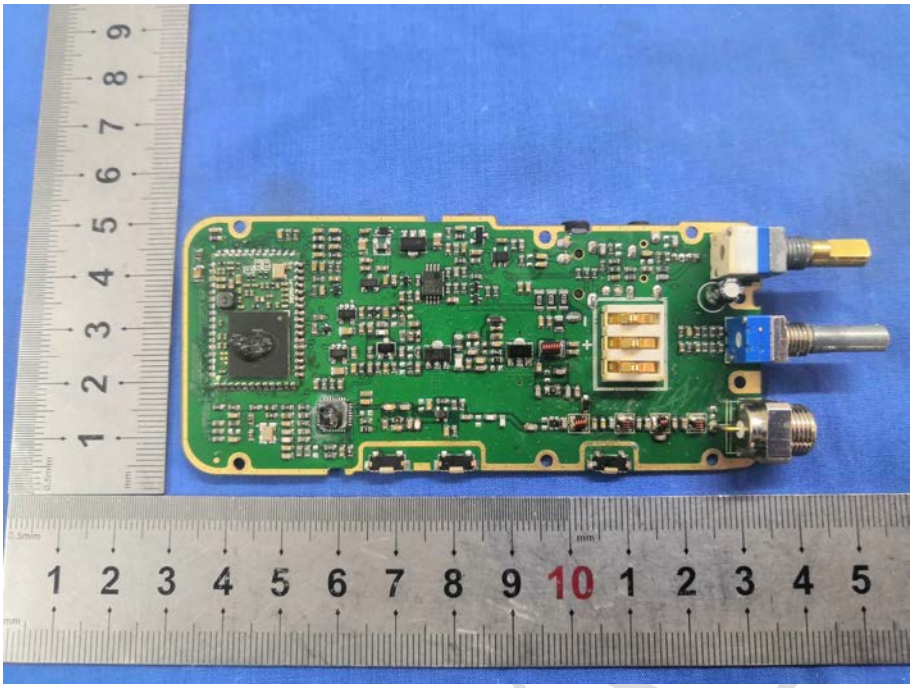


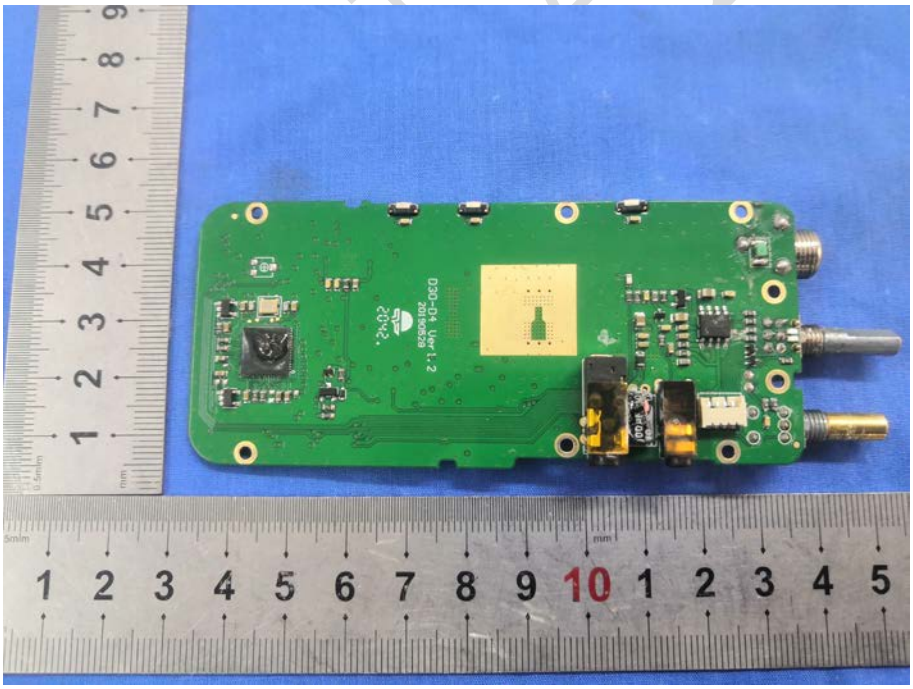


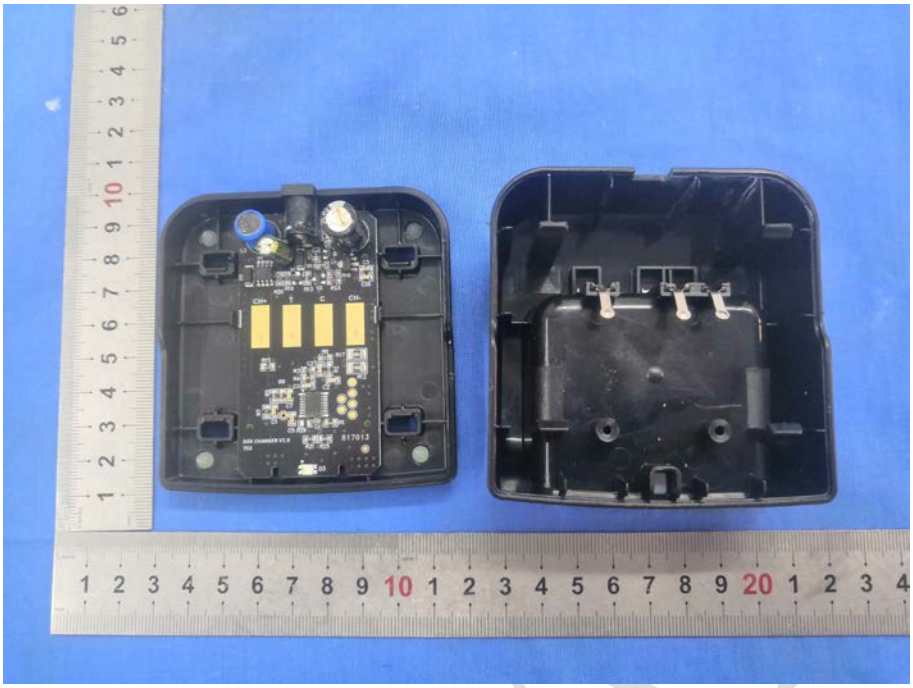

TRAVEL CHARGER

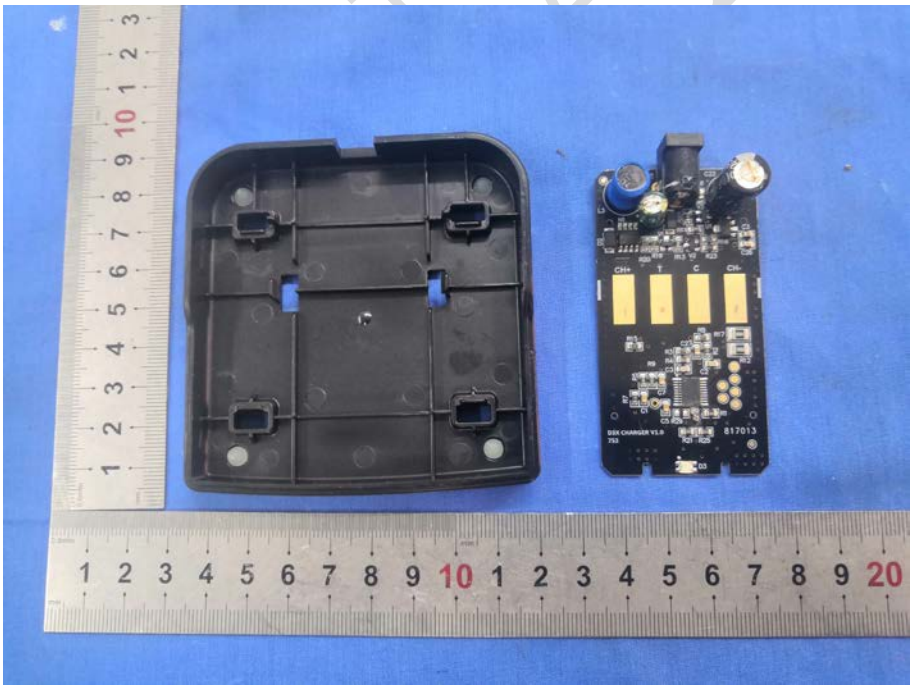

SWITCHING ADAPTER

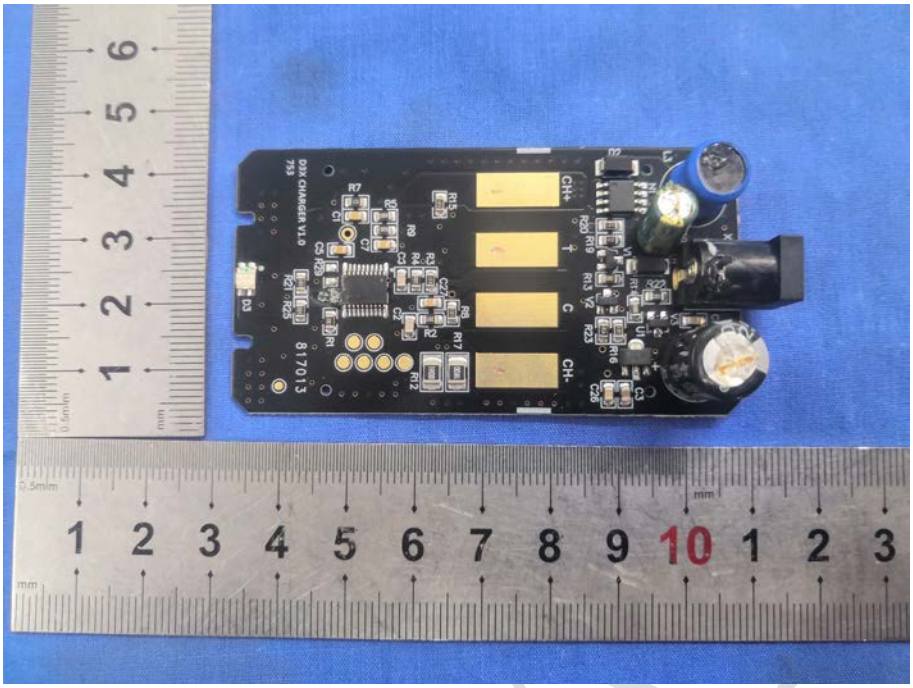

SWITCHING ADAPTER
Model No:GQ24-120200-AG
Input:100-240V~ 50/60Hz 1.0A Max
Output:12.0V⎓2.0A 24.0W
Dong Guan City GangQi Electronic Co.,Ltd
MADE IN CHINA











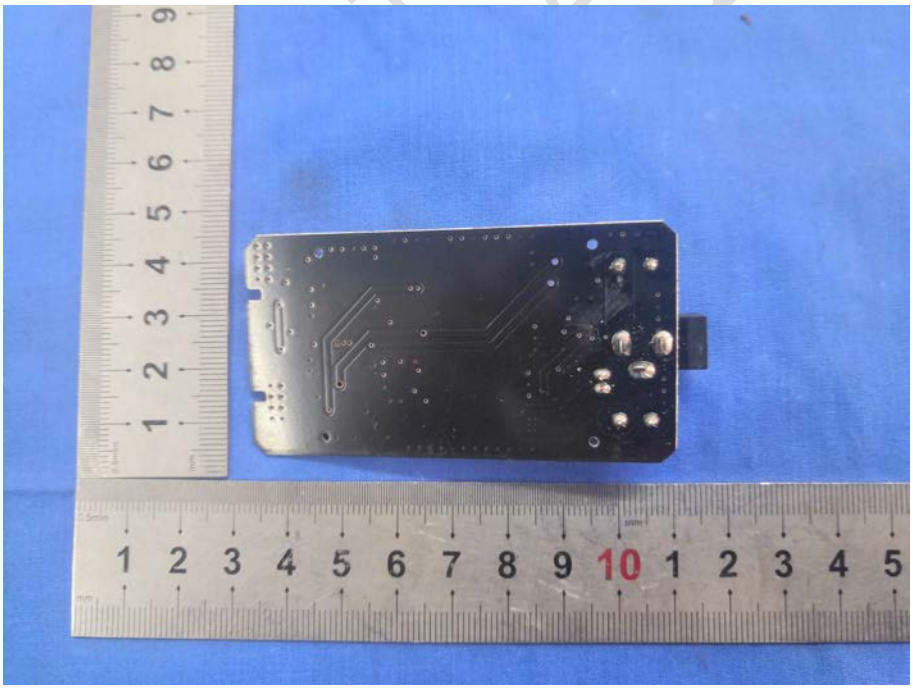
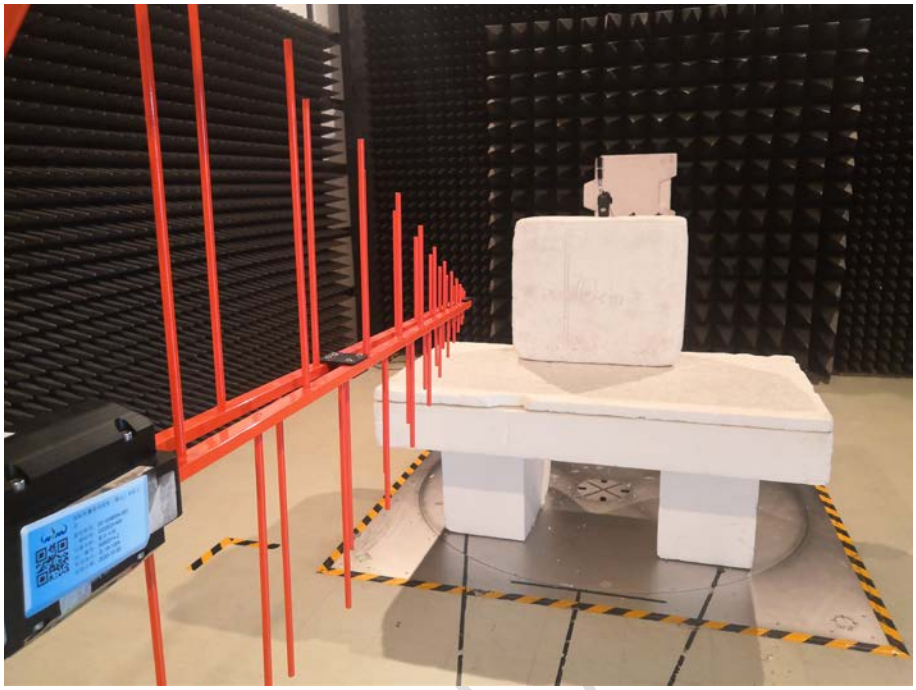


EXHIBIT B – TEST SETUP PHOTOGRAPHS

Radiated Spurious Emissions View (Below 1 GHz)



Radiated Spurious Emissions View (Above 1 GHz)

Declarations

1: BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.

2: Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

3: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

4: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

5: This report cannot be reproduced except in full, without prior written approval of the Company.

6: This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

******* END OF REPORT *******