



TEST REPORT

Applicant Name : Shenzhen Youmi Intelligent Technology Co., Ltd.
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Report Number : SZNS211130-61697E-RF-00C
FCC ID: 2ATZ4-BG2P5G

Test Standard (s)

FCC PART 27; FCC PART 22H; FCC PART 24E

Sample Description

Product Type: RP02
Model No.: BISON GT2 5G
Multiple Model(s) No.: BISON GT2 PRO 5G (Please refer to DOS for Model difference)
Trade Mark: UMIDIGI
Date Received: 2021/11/30
Date of Test: 2021/12/22~2022/01/27
Report Date: 2022/01/27

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Ting Lü
EMC Engineer

Approved By:

Robert Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk “* ”.

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FCC -2G,3G,4G

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Frequency Range	GSM 850: 824-849MHz(TX); 869-894MHz(RX) PCS 1900: 1850-1910MHz(TX); 1930-1990MHz(RX) WCDMA Band 2: 1850-1910MHz(TX); 1930-1990MHz(RX) WCDMA Band 5: 824-849MHz(TX); 869-894MHz(RX) LTE Band 2: 1850-1910MHz(TX); 1930-1990MHz(RX) LTE Band 5: 824-849MHz(TX); 869-894MHz(RX) LTE Band 12: 699-716MHz(TX); 729-746MHz(RX) LTE Band 41: 2496-2690MHz(TX/RX)
Modulation Technique	2G: GMSK, 8PSK 3G: BPSK, QPSK, 16QAM 4G: QPSK, 16QAM
Antenna Specification*	GSM850/WCDMA Band 5/ LTE Band 5: -1.23dBi PCS1900/WCDMA Band 2/ LTE Band 2: 0.87dBi LTE Band 12: -1.88dBi LTE Band 41: 1.89dBi (provided by the applicant)
Voltage Range	DC 3.87V from battery or DC 5V/7.0V/9.0V/12.0V from adapter
Sample serial number	SZNS211130-61697E-RF-S1 for Conducted and Radiated Emissions SZNS211130-61697E-RF-S2 for RF Conducted Test (Assigned by ATC)
Sample/EUT Status	Good condition
Adapter information	Model: HJ-FC017K7-US Input: AC 100-240V, 50/60Hz, 0.6A Output: DC 5.0V, 2.0A OR DC 7.0V, 2.0A OR DC 9.0V, 2.0A OR DC 12.0V, 1.5A, 18.0W
Normal/Extreme Condition	N.V.: Nominal Voltage: 3.87V _{DC} L.V.: Low Voltage 3.45V _{DC} ; L.T. H.V.: High Voltage 4.35V _{DC} ; H.T.

Objective

This test report is in accordance with Part 2-Subpart J, Part 22-Subpart H, Part 24-Subpart E, and Subpart 27 of the Federal Communication Commission's rules.

The objective is to determine the compliance of the EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability and band edge.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2-Subpart J as well as the following parts:

Part 22 Subpart H - Public Mobile Services
 Part 24 Subpart E - Personal Communication Services
 Part 27 - Miscellaneous Wireless Communications Services

ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.
 Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF Frequency		0.082×10^{-7}
RF output power, conducted		0.73dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.66dB
	30MHz - 1GHz	4.28dB
	1GHz - 18GHz	4.98dB
	18GHz - 26.5GHz	5.06dB
	26.5GHz - 40GHz	4.72dB
Temperature		1°C
Humidity		6%
Supply voltages		0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISED), the Registration Number is 5077A.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The final qualification test was performed with the EUT operating at normal mode.

Frequency band	Bandwidth (MHz)	Test Frequency(MHz)		
		Low	Middle	High
GSM850	0.25	824.2	836.6	848.8
PCS1900	0.25	1850.2	1880	1909.8
WCDMA B2	4.2	1852.4	1880	1907.6
WCDMA B5	4.2	826.4	836.6	846.6
LTE B2	1.4	1850.7	1880	1909.3
	3	1851.5	1880	1908.5
	5	1852.5	1880	1907.5
	10	1855	1880	1905
	15	1857.5	1880	1902.5
	20	1860	1880	1900
LTE B5	1.4	824.7	836.5	848.3
	3	825.5	836.5	847.5
	5	826.5	836.5	846.5
	10	829	836.5	844
LTE B12	1.4	699.7	707.5	715.3
	3	700.5	707.5	714.5
	5	701.5	707.5	713.5
	10	704.0	707.5	711
LTE B41	5	2498.5	2593	2687.5
	10	2501	2593	2685
	15	2503.5	2593	2682.5
	20	2506	2593	2680

Equipment Modifications

No modification was made to the EUT.

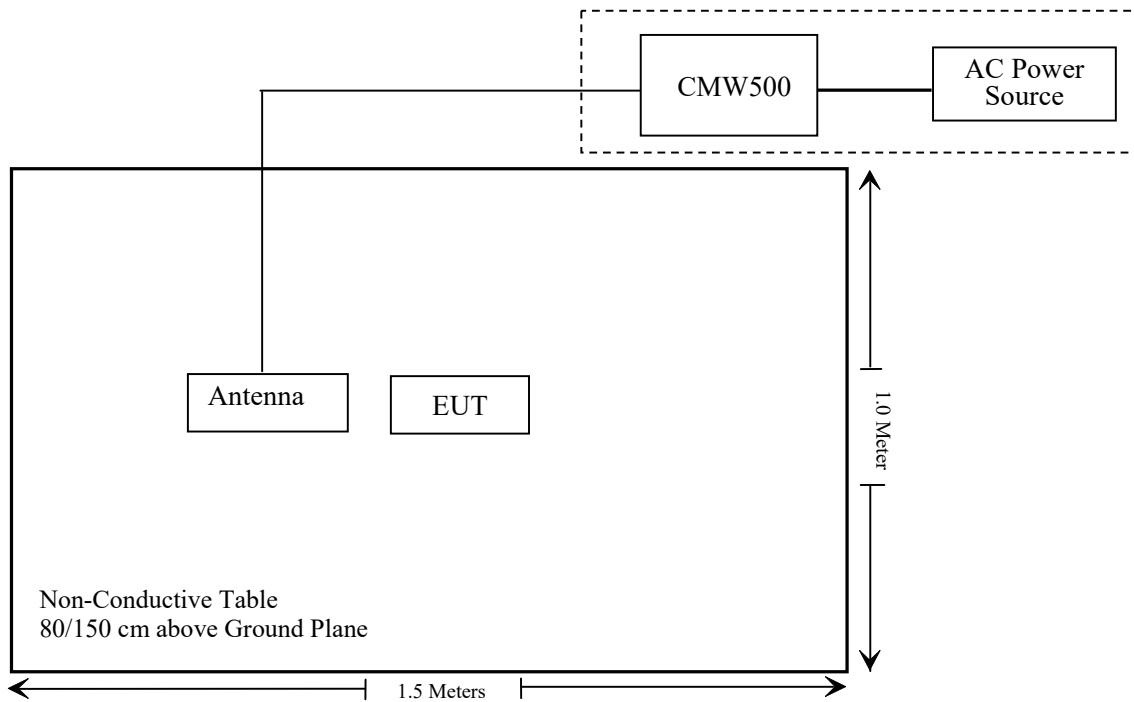
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-11621 8-UY

Support Cable Description

Cable Description	Length (m)	From / Port	To
Un-shielded Un-detachable AC cable	1.2	AC Power	CMW500/ CMU200

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 1.1307 , §2.1093	RF Exposure (SAR)	Compliant
§2.1046; § 22.913 (a); § 24.232 (c); §27.50 (b) (c) (d) (h);	RF Output Power	Compliant
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917; § 24.238; §27.53	Occupied Bandwidth	Compliant
§ 2.1051; § 22.917 (a); § 24.238 (a); §27.53;	Spurious Emissions at Antenna Terminal	Compliant
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53	Field Strength of Spurious Radiation	Compliant
§ 22.917 (a); § 24.238 (a); §27.53 (c) (h) (m)	Band Edge	Compliant
§ 2.1055; § 22.355; § 24.235; §27.54;	Frequency stability	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Rohde& Schwarz	Test Receiver	ESR	102725	2021/12/13	2022/12/12
Rohde&Schwarz	Spectrum Analyzer	FSV40	101949	2021/12/13	2022/12/12
SONOMA INSTRUMENT	Amplifier	310 N	186131	2021/11/09	2022/11/08
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2021/11/09	2022/11/08
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2021/11/11	2022/11/10
Unknown	RF Coaxial Cable	No.10	N050	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.11	N1000	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.12	N040	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.13	N300	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.14	N800	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.15	N600	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.16	N650	2021/12/14	2022/12/13
Unknown	Band Reject Filter	MSF824-862MS-1147	201706003	2021/12/14	2022/12/13
Unknown	Band Reject Filter	MSF1850-1910MS-1148	201706003	2021/12/14	2022/12/13
Unknown	Band Reject Filter	MSF2495-2570MS-1152	201706003	2021/12/14	2022/12/13
Unknown	Band Reject Filter	MSF700-800MS-1153	201706003	2021/12/14	2022/12/13
Schwarzbeck	Bilog Antenna	VULB9163	9163-194	2020/01/05	2023/01/04
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-655	2020/01/05	2023/01/04
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
PASTERNAK	Horn Antenna	PE9852/2F-20	1120	2020/01/05	2023/01/04
PASTERNAK	Horn Antenna	PE9852/2F-20	1120	2020/01/05	2023/01/04
Agilent	Signal Generator	N5183A	MY51040755	2021/12/13	2022/12/12

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
SPECTRUM ANALYZER	Rohde & Schwarz	FSU26	200982	2021/07/06	2022/07/05
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	154606	2021/12/13	2022/12/12
Mini-Circuits	Power Splitter	DC-18000MHz	SF10944151S	2021/12/14	2022/12/13
Gongwen	Temp. & Humid. Chamber	HSD-500	109	2021/10/14	2022/10/13

* Statement of Traceability: Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §1.1307(b) & §2.1093 - RF EXPOSURE INFORMATION

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliant, please refer to the SAR report: SZNS211130-61697E-20.

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H,24E&27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

FCC § 2.1046, § 22.913 (a) & § 24.232 (c); §27.50 (c) (h) - RF OUTPUT POWER

Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

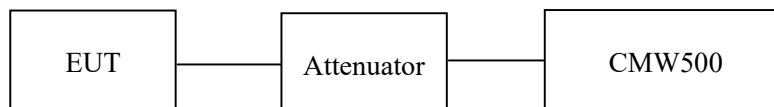
According to §27.50(c), Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP. And Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2496-2690MHz.

Test Procedure

Conducted method:

The RF output of the transmitter was connected to the CMW500 through sufficient attenuation.



ANSI C63.26-2015 Section 5.5.

Test Data

Environmental Conditions

Temperature:	27.2 °C
Relative Humidity:	56.8 %
ATM Pressure:	101.0 kPa

The testing was performed by Gala Liu from 2021-12-22 to 2022-01-12.

Conducted Power**Cellular Band (Part 22H)**

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	ERP(dBm)	Limit (dBm)
GSM	128	824.2	32.50	28.62	38.45
	190	836.6	32.50	28.62	38.45
	251	848.8	32.60	28.72	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				ERP(dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	32.38	31.18	28.87	27.65	28.50	27.3	24.99	23.77	38.45
	190	836.6	32.42	31.21	28.94	27.72	28.54	27.33	25.06	23.84	38.45
	251	848.8	32.50	31.25	29.05	27.81	28.62	27.37	25.17	23.93	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				ERP(dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	28.33	27.48	24.85	23.24	24.45	23.6	20.97	19.36	38.45
	190	836.6	28.15	27.39	24.72	23.09	24.27	23.51	20.84	19.21	38.45
	251	848.8	28.08	27.25	24.52	22.81	24.20	23.37	20.64	18.93	38.45

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 5)	RMC12.2k		22.31	22.19	22.33	18.43	18.31	18.45
	HSDPA	1	20.79	20.43	20.37	16.91	16.55	16.49
		2	20.88	20.52	20.53	17.00	16.64	16.65
		3	20.75	20.61	20.54	16.87	16.73	16.66
		4	20.56	20.59	20.64	16.68	16.71	16.76
	HSUPA	1	21.67	21.35	21.40	17.79	17.47	17.52
		2	21.58	21.48	21.33	17.70	17.60	17.45
		3	21.57	21.56	21.35	17.69	17.68	17.47
		4	21.33	21.53	21.34	17.45	17.65	17.46
		5	21.42	21.55	21.43	17.54	17.67	17.55
	HSPA+	1	21.46	21.40	21.38	17.58	17.52	17.50

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)
For GSM850 / WCDMA Band5: Antenna Gain = -1.23dBi = -3.38dBd (0dBd=2.15dBi)
Cable Loss(dB) = 0.5 dB * (provided by the applicant)
Limit: ERP≤38.45dBm

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	EIRP(dBm)	Limit (dBm)
GSM	512	1850.2	31.20	31.07	33
	661	1880.0	31.30	31.17	33
	810	1909.8	31.50	31.37	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				EIRP(dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	29.88	28.71	27.13	25.22	29.75	28.58	27.00	25.09	33
	661	1880.0	29.79	28.55	27.15	25.32	29.66	28.42	27.02	25.19	33
	810	1909.8	29.86	28.46	27.23	25.24	29.73	28.33	27.10	25.11	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				EIRP(dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	26.73	25.81	23.94	22.52	26.60	25.68	23.81	22.39	33
	661	1880.0	26.17	25.10	23.13	21.54	26.04	24.97	23.00	21.41	33
	810	1909.8	25.69	24.43	22.30	21.01	25.56	24.30	22.17	20.88	33

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 2)	RMC12.2k		20.89	20.98	21.32	20.76	20.85	21.19
	HSDPA	1	19.01	19.04	19.26	18.88	18.91	19.13
		2	19.22	19.15	19.28	19.09	19.02	19.15
		3	19.32	19.42	19.33	19.19	19.29	19.20
		4	19.33	19.35	19.34	19.20	19.22	19.21
	HSUPA	1	20.16	20.37	20.47	20.03	20.24	20.34
		2	20.23	20.18	20.42	20.10	20.05	20.29
		3	20.31	20.22	20.41	20.18	20.09	20.28
		4	20.33	20.31	20.35	20.20	20.18	20.22
		5	20.22	20.17	20.28	20.09	20.04	20.15
	HSPA+	1	20.35	20.46	20.48	20.22	20.33	20.35

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable Loss(dB)

For PCS1900 / WCDMA Band2: Antenna Gain = 0.87dBi

Cable Loss(dB) = 1.0 dB *(provided by the applicant)

Limit: EIRP≤33dBm

LTE Band 2:**Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	22.12	22.20	22.12	21.99	22.07	21.99
		RB1#3	22.17	22.18	22.13	22.04	22.05	22.00
		RB1#5	22.12	22.19	22.19	21.99	22.06	22.06
		RB3#0	22.35	22.38	22.33	22.22	22.25	22.20
		RB3#3	22.40	22.35	22.31	22.27	22.22	22.18
		RB6#0	21.21	21.23	21.23	21.08	21.10	21.10
	16QAM	RB1#0	21.23	21.38	21.39	21.10	21.25	21.26
		RB1#3	21.24	21.44	21.39	21.11	21.31	21.26
		RB1#5	21.23	21.38	21.45	21.10	21.25	21.32
		RB3#0	21.27	21.45	21.18	21.14	21.32	21.05
		RB3#3	21.27	21.48	21.18	21.14	21.35	21.05
		RB6#0	20.11	20.21	20.27	19.98	20.08	20.14
3.0	QPSK	RB1#0	22.41	22.19	22.14	22.28	22.06	22.01
		RB1#8	22.35	22.23	22.16	22.22	22.10	22.03
		RB1#14	22.35	22.16	22.30	22.22	22.03	22.17
		RB6#0	21.20	21.29	21.24	21.07	21.16	21.11
		RB6#9	21.18	21.21	21.27	21.05	21.08	21.14
		RB15#0	21.23	21.26	21.26	21.10	21.13	21.13
	16QAM	RB1#0	21.58	21.45	21.25	21.45	21.32	21.12
		RB1#8	21.52	21.42	21.23	21.39	21.29	21.10
		RB1#14	21.52	21.36	21.35	21.39	21.23	21.22
		RB6#0	20.20	20.23	20.06	20.07	20.10	19.93
		RB6#9	20.14	20.19	20.06	20.01	20.06	19.93
		RB15#0	20.21	20.15	20.27	20.08	20.02	20.14

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	22.51	22.23	22.24	22.38	22.10	22.11
		RB1#13	22.48	22.22	22.25	22.35	22.09	22.12
		RB1#24	22.46	22.23	22.37	22.33	22.10	22.24
		RB15#0	21.29	21.31	21.37	21.16	21.18	21.24
		RB15#10	21.26	21.22	21.22	21.13	21.09	21.09
		RB25#0	21.19	21.23	21.19	21.06	21.10	21.06
	16QAM	RB1#0	21.15	21.50	21.26	21.02	21.37	21.13
		RB1#13	21.15	21.46	21.23	21.02	21.33	21.10
		RB1#24	21.14	21.39	21.36	21.01	21.26	21.23
		RB15#0	20.28	20.30	20.25	20.15	20.17	20.12
		RB15#10	20.23	20.18	20.13	20.10	20.05	20.00
		RB25#0	20.23	20.22	20.19	20.10	20.09	20.06
10.0	QPSK	RB1#0	22.40	22.25	22.35	22.27	22.12	22.22
		RB1#25	22.40	22.31	22.23	22.27	22.18	22.10
		RB1#49	22.38	22.19	22.26	22.25	22.06	22.13
		RB25#0	21.21	21.24	21.20	21.08	21.11	21.07
		RB25#25	21.22	21.24	21.24	21.09	21.11	21.11
		RB50#0	21.19	21.25	21.23	21.06	21.12	21.10
	16QAM	RB1#0	21.57	21.46	21.38	21.44	21.33	21.25
		RB1#25	21.52	21.49	21.24	21.39	21.36	21.11
		RB1#49	21.58	21.36	21.30	21.45	21.23	21.17
		RB25#0	20.19	20.25	20.26	20.06	20.12	20.13
		RB25#25	20.21	20.21	20.23	20.08	20.08	20.10
		RB50#0	20.14	20.19	20.16	20.01	20.06	20.03

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
15.0	QPSK	RB1#0	22.33	22.23	22.20	22.20	22.10	22.07
		RB1#38	22.41	22.31	22.24	22.28	22.18	22.11
		RB1#74	22.32	22.18	22.21	22.19	22.05	22.08
		RB36#0	21.15	21.23	21.24	21.02	21.10	21.11
		RB36#39	21.21	21.23	21.17	21.08	21.10	21.04
		RB75#0	21.20	21.20	21.20	21.07	21.07	21.07
	16QAM	RB1#0	21.52	21.39	21.64	21.39	21.26	21.51
		RB1#38	21.57	21.46	21.58	21.44	21.33	21.45
		RB1#74	21.65	21.34	21.45	21.52	21.21	21.32
		RB36#0	20.13	20.19	20.22	20.00	20.06	20.09
		RB36#39	20.14	20.16	20.15	20.01	20.03	20.02
		RB75#0	20.09	20.14	20.16	19.96	20.01	20.03
20.0	QPSK	RB1#0	22.01	21.93	22.07	21.88	21.80	21.94
		RB1#50	22.17	22.08	22.26	22.04	21.95	22.13
		RB1#99	22.16	22.02	22.06	22.03	21.89	21.93
		RB50#0	21.16	21.12	21.32	21.03	20.99	21.19
		RB50#50	21.16	21.09	21.24	21.03	20.96	21.11
		RB100#0	21.36	21.15	21.52	21.23	21.02	21.39
	16QAM	RB1#0	21.21	21.32	21.78	21.08	21.19	21.65
		RB1#50	21.34	21.42	21.95	21.21	21.29	21.82
		RB1#99	21.37	21.31	21.71	21.24	21.18	21.58
		RB50#0	20.09	20.09	20.27	19.96	19.96	20.14
		RB50#50	20.05	20.08	20.17	19.92	19.95	20.04
		RB100#0	20.18	20.07	20.22	20.05	19.94	20.09

Note: $EIRP(dBm) = \text{Conducted Power}(dBm) + \text{Antenna Gain}(dBi) - \text{Cable Loss}(dB)$

For Band 2: Antenna Gain = 0.87dBi

Cable Loss(dB) = 1.0 dB * (provided by the applicant)

Limit: $EIRP \leq 33dBm$

LTE Band 5

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	22.62	22.61	22.56	18.74	18.73	18.68
		RB1#3	22.63	22.59	22.60	18.75	18.71	18.72
		RB1#5	22.68	22.61	22.58	18.80	18.73	18.70
		RB3#0	22.81	22.75	22.76	18.93	18.87	18.88
		RB3#3	22.78	22.74	22.80	18.90	18.86	18.92
		RB6#0	21.66	21.65	21.65	17.78	17.77	17.77
	16QAM	RB1#0	21.81	21.85	21.66	17.93	17.97	17.78
		RB1#3	21.91	21.85	21.64	18.03	17.97	17.76
		RB1#5	21.88	21.83	21.64	18.00	17.95	17.76
		RB3#0	21.89	21.61	21.67	18.01	17.73	17.79
		RB3#3	21.93	21.59	21.64	18.05	17.71	17.76
		RB6#0	20.62	20.68	20.48	16.74	16.80	16.60
3.0	QPSK	RB1#0	22.89	22.59	22.62	19.01	18.71	18.74
		RB1#8	22.82	22.62	22.56	18.94	18.74	18.68
		RB1#14	22.84	22.62	22.59	18.96	18.74	18.71
		RB6#0	21.69	21.64	21.69	17.81	17.76	17.81
		RB6#9	21.69	21.74	21.64	17.81	17.86	17.76
		RB15#0	21.65	21.66	21.66	17.77	17.78	17.78
	16QAM	RB1#0	22.14	21.81	21.71	18.26	17.93	17.83
		RB1#8	22.16	21.82	21.60	18.28	17.94	17.72
		RB1#14	22.13	21.81	21.68	18.25	17.93	17.80
		RB6#0	20.69	20.64	20.49	16.81	16.76	16.61
		RB6#9	20.65	20.67	20.41	16.77	16.79	16.53
		RB15#0	20.72	20.59	20.63	16.84	16.71	16.75

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	23.02	22.72	22.73	19.14	18.84	18.85
		RB1#13	22.96	22.66	22.70	19.08	18.78	18.82
		RB1#24	23.01	22.65	22.72	19.13	18.77	18.84
		RB15#0	21.75	21.68	21.75	17.87	17.80	17.87
		RB15#10	21.72	21.64	21.60	17.84	17.76	17.72
		RB25#0	21.70	21.66	21.57	17.82	17.78	17.69
	16QAM	RB1#0	21.68	21.96	21.74	17.80	18.08	17.86
		RB1#13	21.63	21.87	21.68	17.75	17.99	17.80
		RB1#24	21.66	21.86	21.68	17.78	17.98	17.80
		RB15#0	20.76	20.66	20.69	16.88	16.78	16.81
		RB15#10	20.72	20.54	20.51	16.84	16.66	16.63
		RB25#0	20.72	20.66	20.58	16.84	16.78	16.70
10.0	QPSK	RB1#0	22.88	22.73	22.74	19.00	18.85	18.86
		RB1#25	22.86	22.77	22.81	18.98	18.89	18.93
		RB1#49	22.85	22.70	22.78	18.97	18.82	18.90
		RB25#0	21.69	21.59	21.72	17.81	17.71	17.84
		RB25#25	21.85	21.57	21.62	17.97	17.69	17.74
		RB50#0	21.90	21.61	21.70	18.02	17.73	17.82
	16QAM	RB1#0	22.16	22.10	22.09	18.28	18.22	18.21
		RB1#25	22.24	22.10	22.13	18.36	18.22	18.25
		RB1#49	22.14	22.02	22.05	18.26	18.14	18.17
		RB25#0	20.69	20.62	20.76	16.81	16.74	16.88
		RB25#25	20.85	20.60	20.64	16.97	16.72	16.76
		RB50#0	20.73	20.56	20.67	16.85	16.68	16.79

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)
For Band5: Antenna Gain = -1.23dBi = -3.38dBd (0dBd=2.15dBi)
Cable Loss(dB) = 0.5 dB * (provided by the applicant)
Limit: ERP ≤ 38.45dBm

LTE Band 12:**Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	22.48	22.51	22.38	17.95	17.98	17.85
		RB1#3	22.42	22.51	22.42	17.89	17.98	17.89
		RB1#5	22.39	22.53	22.42	17.86	18.00	17.89
		RB3#0	22.50	22.63	22.56	17.97	18.10	18.03
		RB3#3	22.44	22.59	22.57	17.91	18.06	18.04
		RB6#0	21.47	21.55	21.50	16.94	17.02	16.97
	16QAM	RB1#0	21.65	21.59	21.53	17.12	17.06	17.00
		RB1#3	21.59	21.56	21.62	17.06	17.03	17.09
		RB1#5	21.59	21.58	21.55	17.06	17.05	17.02
		RB3#0	21.46	21.56	21.62	16.93	17.03	17.09
		RB3#3	21.46	21.52	21.68	16.93	16.99	17.15
		RB6#0	20.45	20.37	20.38	15.92	15.84	15.85
3.0	QPSK	RB1#0	22.59	22.42	22.45	18.06	17.89	17.92
		RB1#8	22.51	22.50	22.46	17.98	17.97	17.93
		RB1#14	22.56	22.52	22.51	18.03	17.99	17.98
		RB6#0	21.43	21.62	21.50	16.90	17.09	16.97
		RB6#9	21.53	21.49	21.49	17.00	16.96	16.96
		RB15#0	21.42	21.52	21.45	16.89	16.99	16.92
	16QAM	RB1#0	22.10	21.68	21.51	17.57	17.15	16.98
		RB1#8	22.01	21.63	21.49	17.48	17.10	16.96
		RB1#14	21.98	21.62	21.58	17.45	17.09	17.05
		RB6#0	20.45	20.52	20.37	15.92	15.99	15.84
		RB6#9	20.50	20.49	20.30	15.97	15.96	15.77
		RB15#0	20.43	20.35	20.43	15.90	15.82	15.90

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	22.75	22.53	22.60	18.22	18.00	18.07
		RB1#13	22.77	22.54	22.56	18.24	18.01	18.03
		RB1#24	22.81	22.66	22.66	18.28	18.13	18.13
		RB15#0	21.33	21.60	21.44	16.80	17.07	16.91
		RB15#10	21.49	21.48	21.39	16.96	16.95	16.86
		RB25#0	21.44	21.56	21.36	16.91	17.03	16.83
	16QAM	RB1#0	21.41	21.77	21.59	16.88	17.24	17.06
		RB1#13	21.39	21.87	21.48	16.86	17.34	16.95
		RB1#24	21.43	21.89	21.56	16.90	17.36	17.03
		RB15#0	20.35	20.54	20.37	15.82	16.01	15.84
		RB15#10	20.49	20.38	20.35	15.96	15.85	15.82
		RB25#0	20.38	20.51	20.37	15.85	15.98	15.84
10.0	QPSK	RB1#0	22.55	22.44	22.38	18.02	17.91	17.85
		RB1#25	22.64	22.62	22.46	18.11	18.09	17.93
		RB1#49	22.62	22.57	22.35	18.09	18.04	17.82
		RB25#0	21.35	21.34	21.39	16.82	16.81	16.86
		RB25#25	21.38	21.28	21.42	16.85	16.75	16.89
		RB50#0	21.16	21.22	21.17	16.63	16.69	16.64
	16QAM	RB1#0	22.04	22.02	22.12	17.51	17.49	17.59
		RB1#25	22.01	22.00	22.05	17.48	17.47	17.52
		RB1#49	22.09	21.99	21.97	17.56	17.46	17.44
		RB25#0	20.33	20.38	20.54	15.80	15.85	16.01
		RB25#25	20.35	20.42	20.56	15.82	15.89	16.03
		RB50#0	20.58	20.51	20.58	16.05	15.98	16.05

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)
For Band12: Antenna Gain = -1.88dBi = -4.03dBd (0dBd=2.15dBi)
Cable Loss=0.5 dB * (provided by the applicant)
Limit: ERP ≤ 34.77dBm

LTE Band 41:**Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5	QP SK	RB1#0	22.68	22.75	22.46	23.57	23.64	23.35
		RB1#13	22.52	22.76	22.42	23.41	23.65	23.31
		RB1#24	22.53	22.76	22.48	23.42	23.65	23.37
		RB15#0	21.71	21.68	21.47	22.60	22.57	22.36
		RB15#10	21.75	21.69	21.51	22.64	22.58	22.40
		RB25#0	21.67	21.70	21.51	22.56	22.59	22.40
	16QAM	RB1#0	21.86	21.59	21.48	22.75	22.48	22.37
		RB1#13	21.85	21.62	21.42	22.74	22.51	22.31
		RB1#24	21.91	21.63	21.47	22.80	22.52	22.36
		RB15#0	20.73	20.66	20.70	21.62	21.55	21.59
		RB15#10	20.78	20.63	20.73	21.67	21.52	21.62
		RB25#0	20.72	20.72	20.75	21.61	21.61	21.64
10	QPSK	RB1#0	22.68	22.38	22.34	23.57	23.27	23.23
		RB1#25	22.63	22.44	22.45	23.52	23.33	23.34
		RB1#49	22.59	22.40	22.42	23.48	23.29	23.31
		RB25#0	21.62	21.58	21.48	22.51	22.47	22.37
		RB25#25	21.80	21.65	21.63	22.69	22.54	22.52
		RB50#0	21.69	21.66	21.53	22.58	22.55	22.42
	16QAM	RB1#0	21.80	21.48	21.55	22.69	22.37	22.44
		RB1#25	21.85	21.54	21.65	22.74	22.43	22.54
		RB1#49	21.88	21.48	21.62	22.77	22.37	22.51
		RB25#0	20.66	20.66	20.69	21.55	21.55	21.58
		RB25#25	20.78	20.71	20.80	21.67	21.60	21.69
		RB50#0	20.67	20.67	20.70	21.56	21.56	21.59

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
15	QP SK	RB1#0	22.66	22.28	22.50	23.55	23.17	23.39
		RB1#38	22.62	22.43	22.63	23.51	23.32	23.52
		RB1#74	22.54	22.34	22.55	23.43	23.23	23.44
		RB36#0	21.60	21.57	21.39	22.49	22.46	22.28
		RB36#39	21.76	21.57	21.50	22.65	22.46	22.39
		RB75#0	21.66	21.62	21.44	22.55	22.51	22.33
	16QAM	RB1#0	21.78	21.43	21.56	22.67	22.32	22.45
		RB1#38	21.88	21.55	21.71	22.77	22.44	22.60
		RB1#74	21.85	21.47	21.66	22.74	22.36	22.55
		RB36#0	20.62	20.58	20.71	21.51	21.47	21.60
		RB36#39	20.74	20.62	20.75	21.63	21.51	21.64
		RB75#0	20.67	20.62	20.65	21.56	21.51	21.54
20	QPSK	RB1#0	22.48	22.22	22.17	23.37	23.11	23.06
		RB1#50	22.52	22.50	22.40	23.41	23.39	23.29
		RB1#99	22.42	22.32	22.34	23.31	23.21	23.23
		RB50#0	21.60	21.66	21.50	22.49	22.55	22.39
		RB50#50	21.83	21.68	21.61	22.72	22.57	22.50
		RB100#0	21.75	21.67	21.53	22.64	22.56	22.42
	16QAM	RB1#0	21.53	21.46	21.71	22.42	22.35	22.60
		RB1#50	21.71	21.65	21.94	22.60	22.54	22.83
		RB1#99	21.63	21.55	21.83	22.52	22.44	22.72
		RB50#0	20.62	20.68	20.68	21.51	21.57	21.57
		RB50#50	20.85	20.75	20.81	21.74	21.64	21.70
		RB100#0	20.75	20.65	20.70	21.64	21.54	21.59

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable Loss(dB)

For Band 41: Antenna Gain = 1.89dBi

Cable Loss(dB)=1 dB*(provided by the applicant)

Limit: EIRP ≤ 33dBm

Peak-to-average ratio (PAR)**Cellular Band**

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	3.62	13
	Middle	3.67	13
	High	3.65	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	3.45	13
	Middle	3.69	13
	High	3.66	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.52	13
	Middle	3.53	13
	High	3.62	13
HSDPA (16QAM)	Low	3.55	13
	Middle	3.65	13
	High	3.64	13
HSUPA (BPSK)	Low	3.63	13
	Middle	3.57	13
	High	3.48	13
HSPA+	Low	3.63	13
	Middle	3.69	13
	High	3.58	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	3.52	13
	Middle	3.44	13
	High	3.46	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	3.53	13
	Middle	3.64	13
	High	3.65	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.42	13
	Middle	3.54	13
	High	3.56	13
HSDPA (16QAM)	Low	3.47	13
	Middle	3.66	13
	High	3.57	13
HSUPA (BPSK)	Low	3.46	13
	Middle	3.47	13
	High	3.53	13
HSPA+	Low	3.42	13
	Middle	3.54	13
	High	3.53	13

LTE Band 2 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	2.69	3.30	3.08	13	Pass
QPSK (100RB Size)	4.87	4.97	5.03	13	Pass
16QAM (1RB Size)	3.62	4.07	4.04	13	Pass
16QAM (100RB Size)	5.71	5.83	5.80	13	Pass

LTE Band 5 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	3.21	3.37	3.37	13	Pass
QPSK (50RB Size)	8.72	6.70	5.19	13	Pass
16QAM (1RB Size)	3.94	4.36	4.23	13	Pass
16QAM (50RB Size)	6.41	9.90	6.09	13	Pass

LTE Band 12 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.68	3.85	4.23	13	Pass
QPSK (50RB Size)	9.86	9.42	7.05	13	Pass
16QAM (1RB Size)	5.71	4.84	5.13	13	Pass
16QAM (50RB Size)	7.35	7.96	7.21	13	Pass

LTE Band 41 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	8.75	9.94	5.54	13	Pass
QPSK (100RB Size)	10.16	6.44	7.24	13	Pass
16QAM (1RB Size)	5.67	4.97	6.38	13	Pass
16QAM (100RB Size)	8.33	7.85	8.27	13	Pass

FCC §2.1049, §22.917, §22.905 & §24.238 & §27.53 - OCCUPIED BANDWIDTH

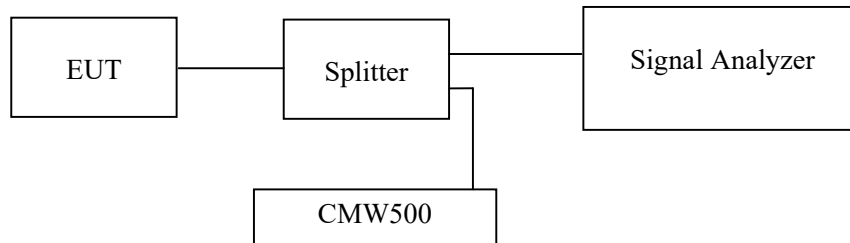
Applicable Standard

FCC 47 §2.1049, §22.917, §22.905, §24.238 and §27.53.

Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 1% to 5% of the anticipated emission bandwidth and the 26 dB & 99% bandwidth was recorded.



Test Data

Environmental Conditions

Temperature:	27.2 °C
Relative Humidity:	56.8 %
ATM Pressure:	101.0 kPa

The testing was performed by Gala Liu from 2021-12-22 to 2022-01-27.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables and plots.

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	128	824.2	248.00	315.31
	190	836.6	248.00	314.88
	251	848.8	248.00	313.27
EGPRS(8PSK)	128	824.2	256.00	322.15
	190	836.6	248.00	316.90
	251	848.8	250.00	316.99

	Frequency (MHz)	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	826.4	4.16	4.77
	836.6	4.16	4.74
	846.6	4.13	4.74
HSDPA	826.4	4.17	4.71
	836.6	4.16	4.73
	846.6	4.14	4.70
HSUPA	826.4	4.16	4.71
	836.6	4.16	4.73
	846.6	4.14	4.72

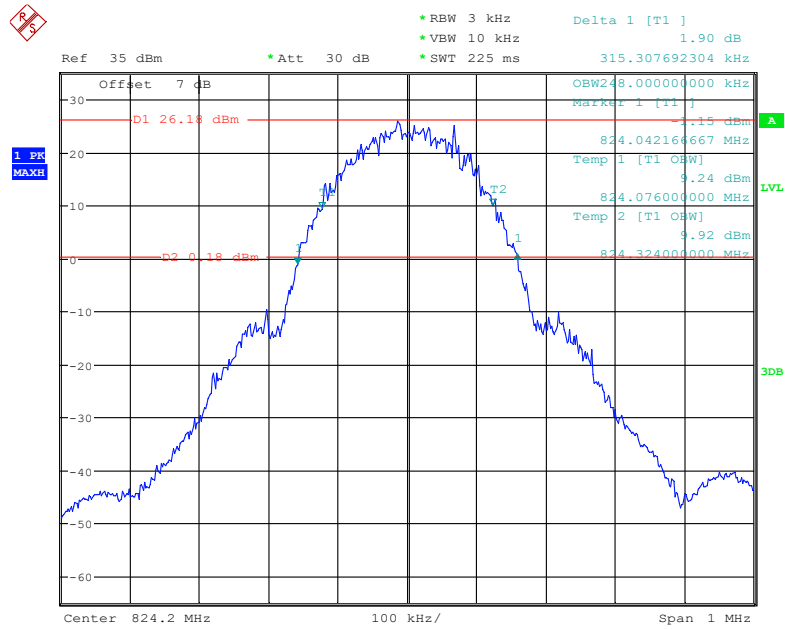
PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	512	1850.2	246.00	314.10
	661	1880.0	248.00	316.94
	810	1909.8	246.00	315.81
EGPRS(8PSK)	512	1850.2	284.00	376.63
	661	1880.0	278.00	367.05
	810	1909.8	272.00	363.01

	Frequency (MHz)	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	1852.4	4.16	4.76
	1880.0	4.16	4.75
	1907.6	4.16	4.73
HSDPA	1852.4	4.16	4.72
	1880.0	4.16	4.69
	1907.6	4.16	4.72
HSUPA	1852.4	4.16	4.74
	1880.0	4.16	4.71
	1907.6	4.16	4.72

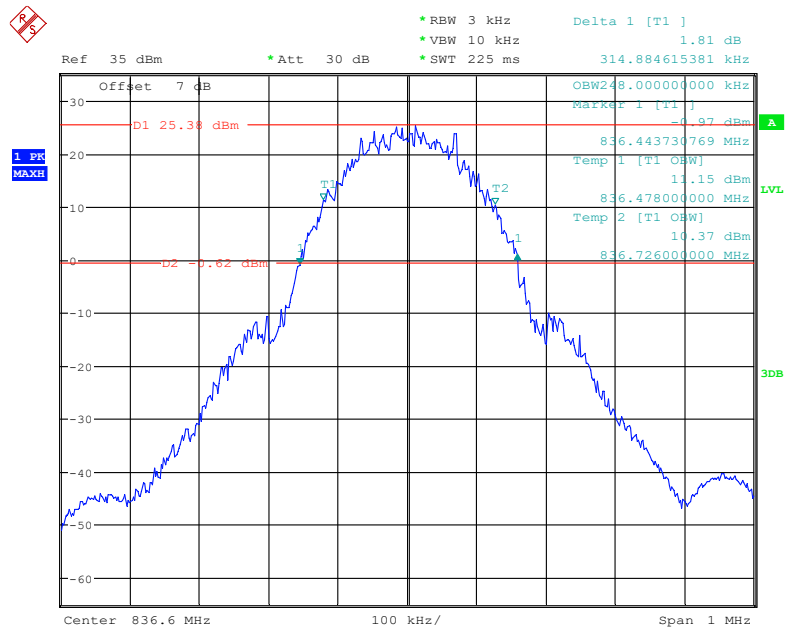
Cellular Band (Part 22H)

26 dB Emissions & 99% Occupied Bandwidth for GSM(GMSK) Mode, Low channel



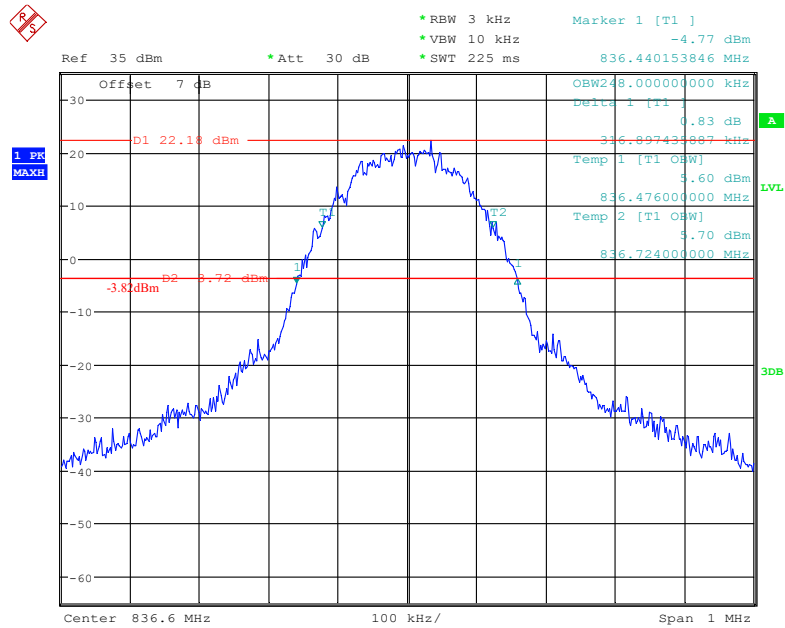
Date: 22.DEC.2021 16:45:16

26 dB Emissions & 99% Occupied Bandwidth for GSM(GMSK) Mode, Middle channel



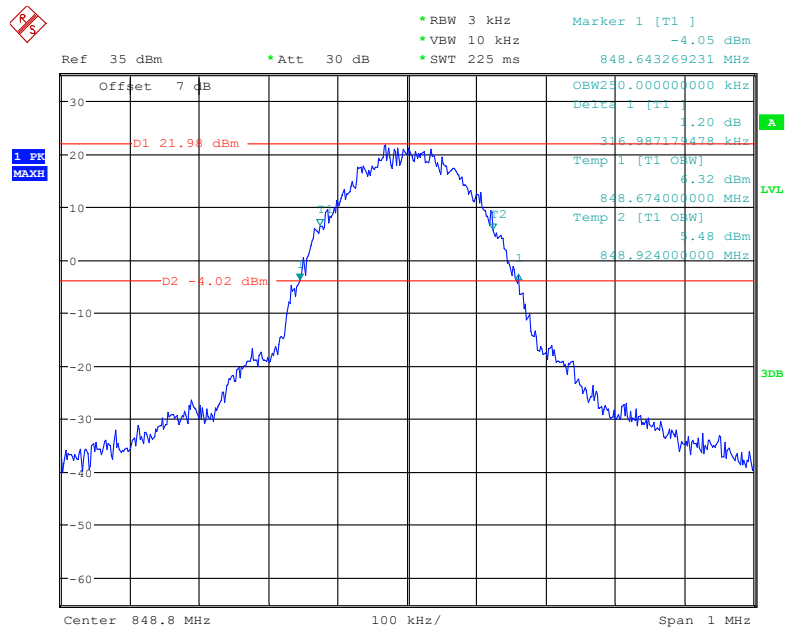
Date: 22.DEC.2021 16:46:30

26 dB Emissions & 99% Occupied Bandwidth for EGPRS (8PSK) Mode, Middle channel



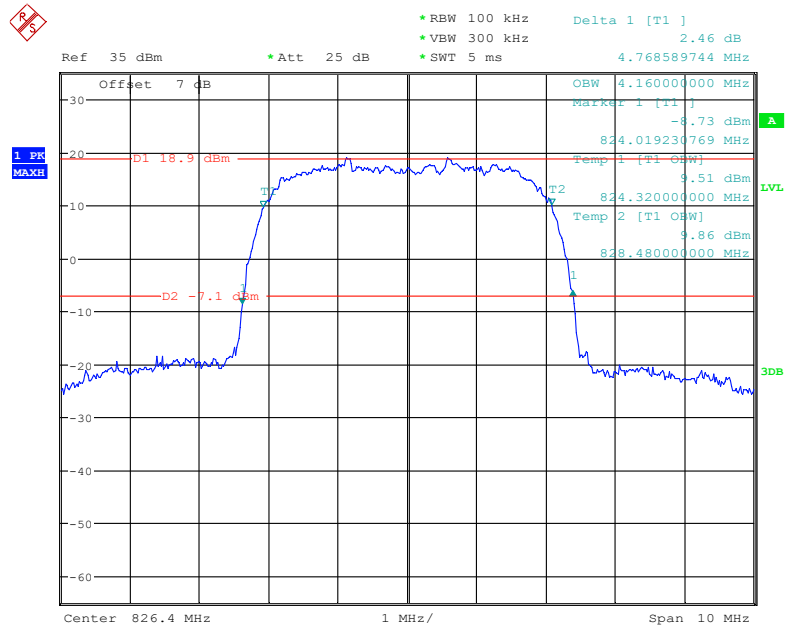
Date: 22.DEC.2021 16:51:57

26 dB Emissions & 99% Occupied Bandwidth for EGPRS (8PSK) Mode, High channel



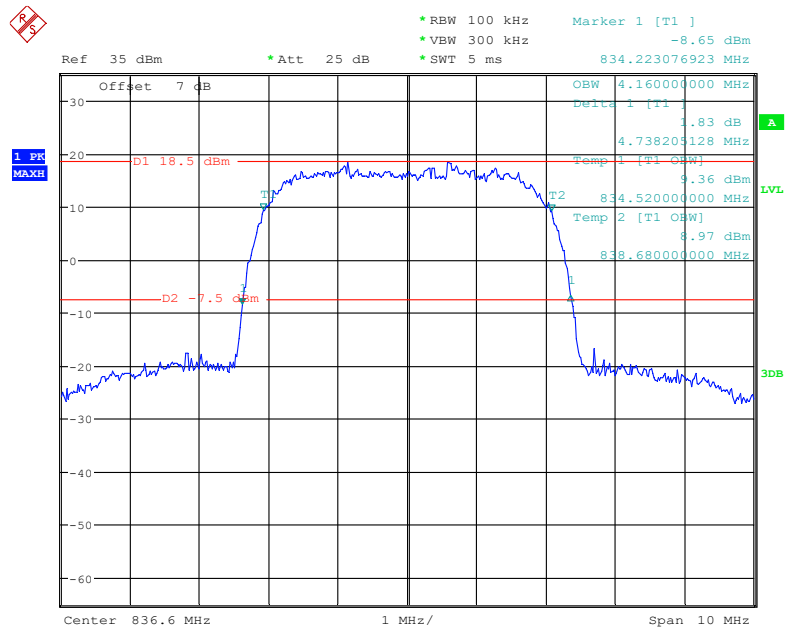
Date: 22.DEC.2021 16:53:36

26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel



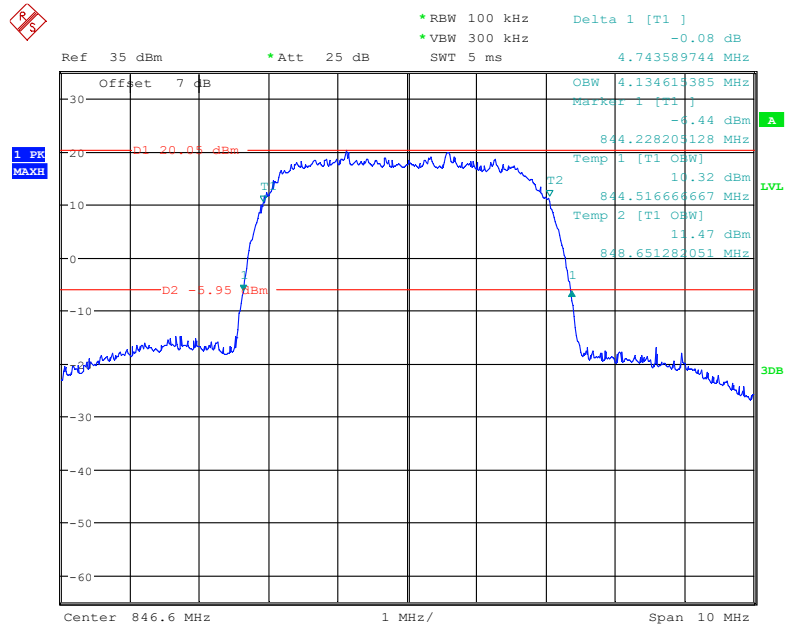
Date: 22.DEC.2021 18:37:38

26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel



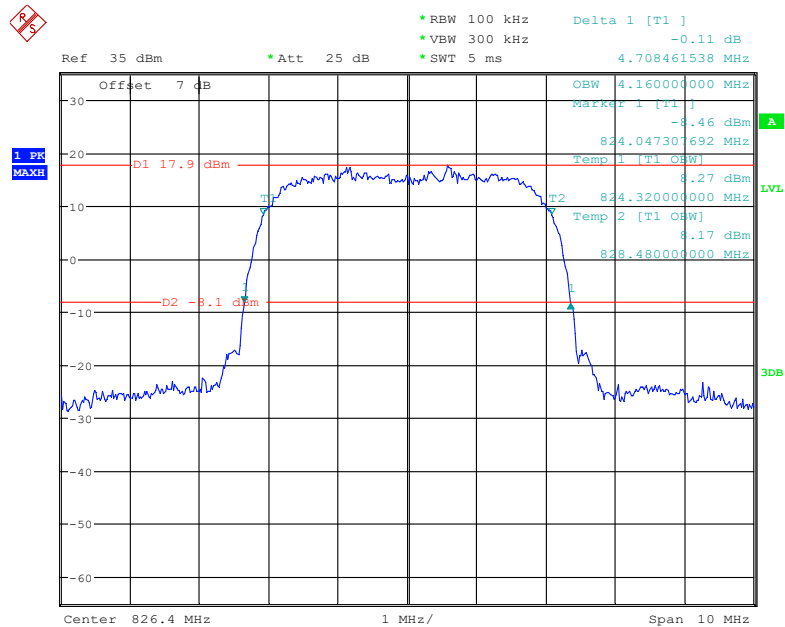
Date: 22.DEC.2021 18:34:42

26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, High channel



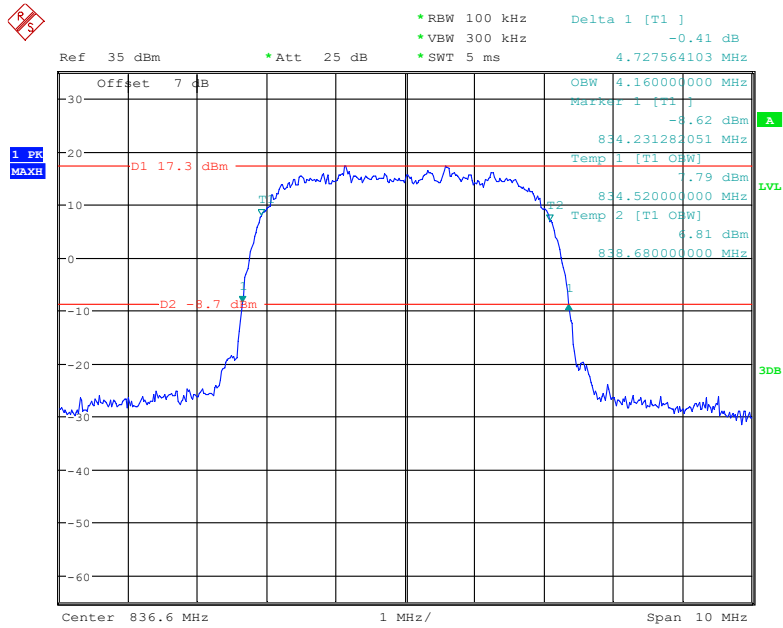
Date: 27.JAN.2022 09:47:10

26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode, Low channel



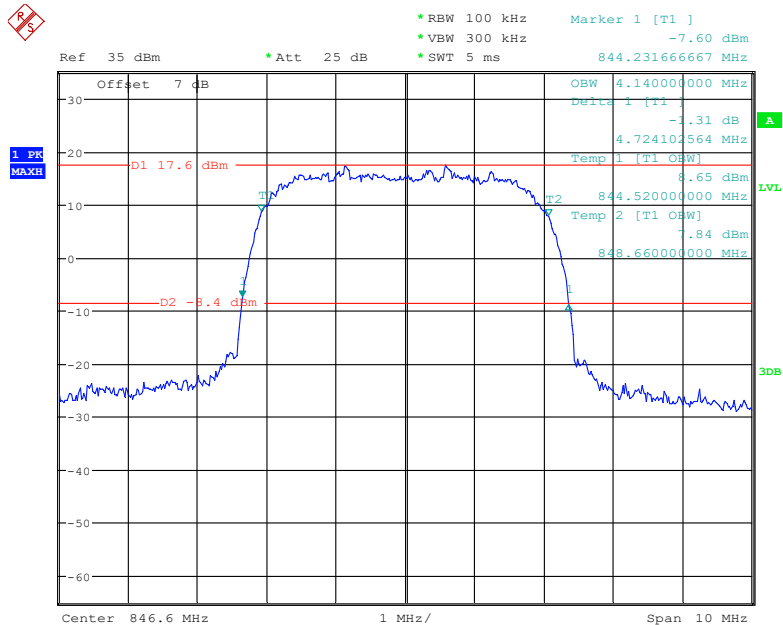
Date: 22.DEC.2021 19:02:29

26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode, Middle channel



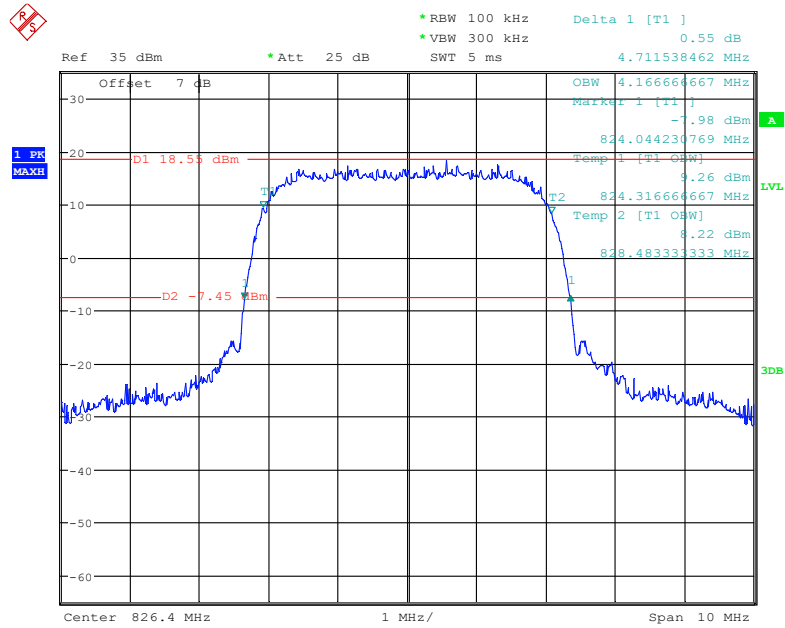
Date: 22.DEC.2021 19:04:33

26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode, High channel



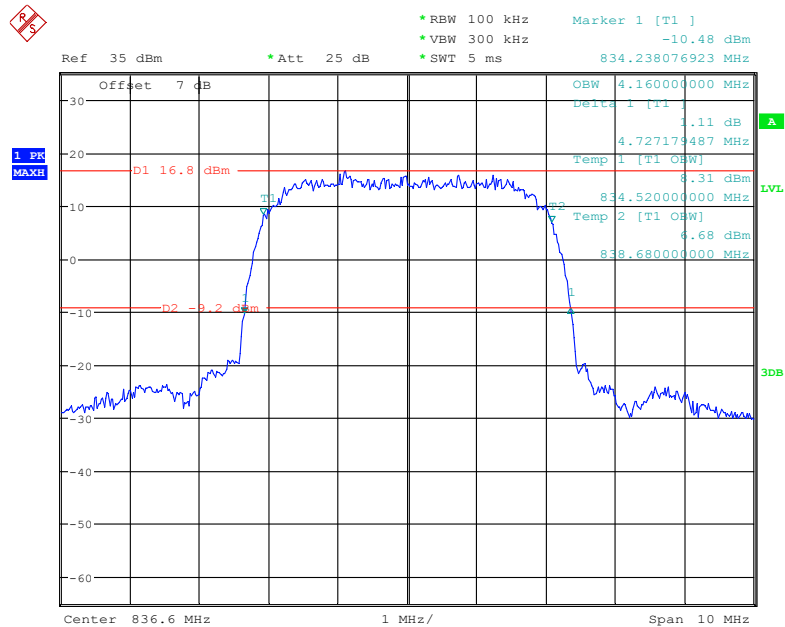
Date: 22.DEC.2021 19:06:38

26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel



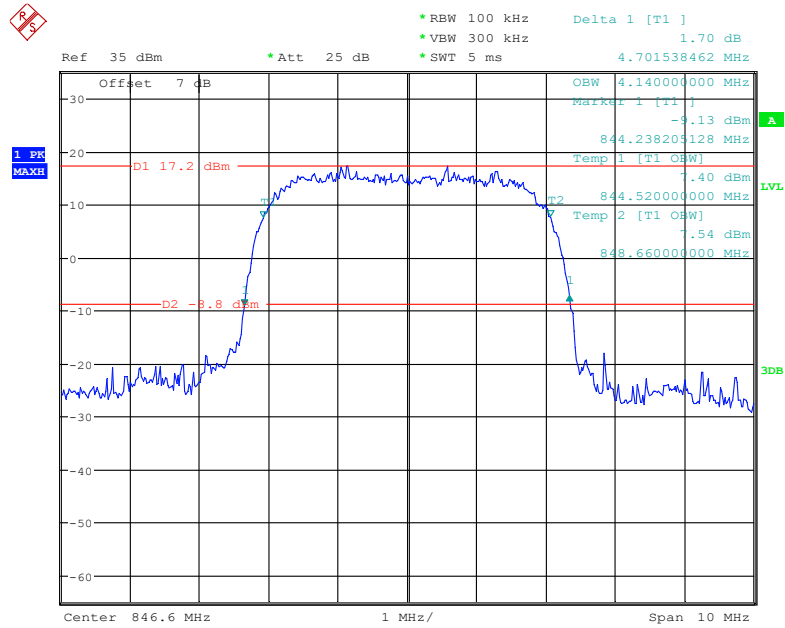
Date: 27.JAN.2022 09:49:16

26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel



Date: 22.DEC.2021 18:49:18

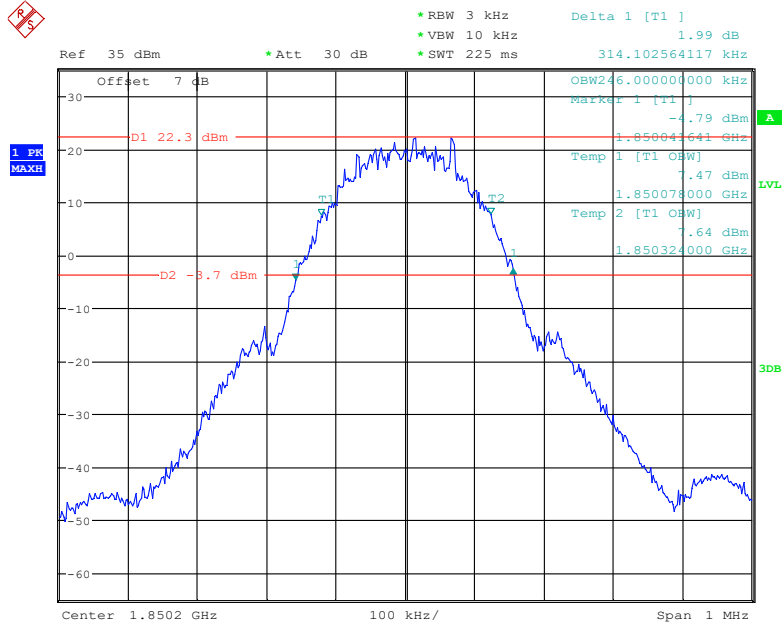
26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel



Date: 22.DEC.2021 18:51:00

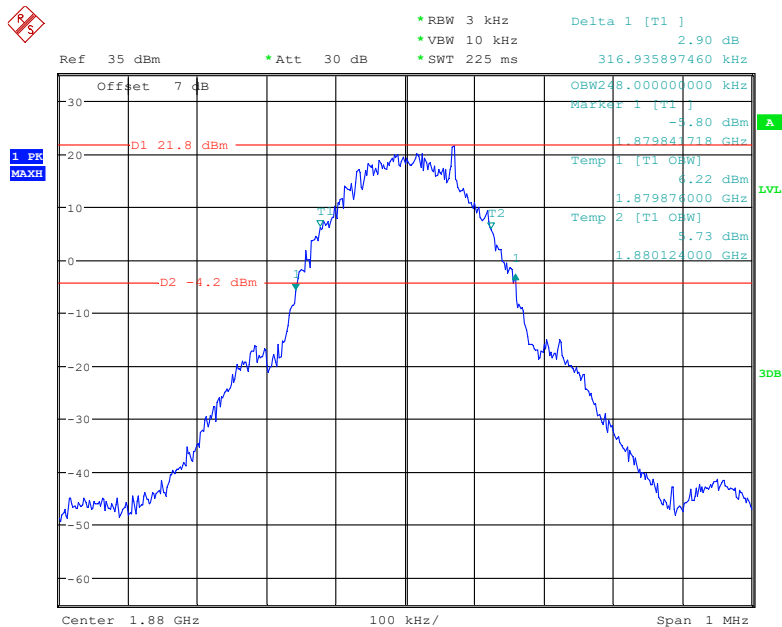
PCS Band (Part 24E)

26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode, Low channel



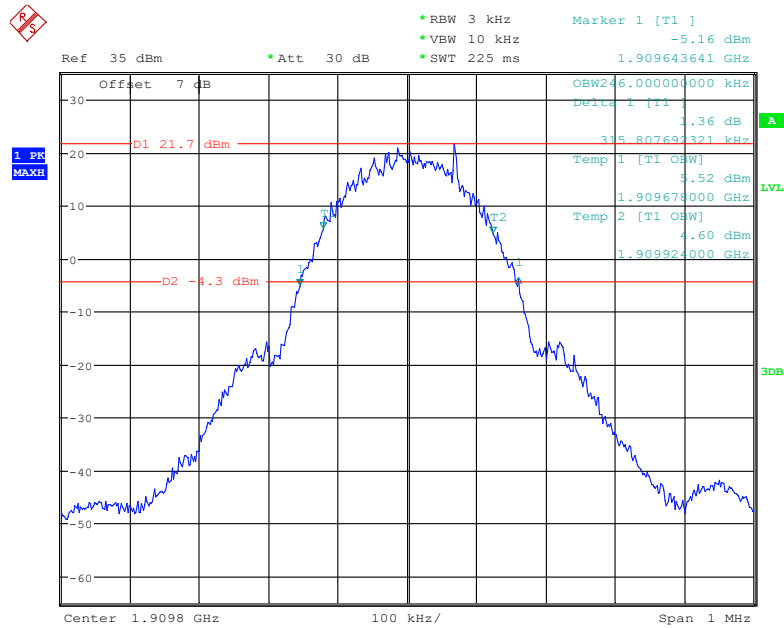
Date: 22.DEC.2021 17:01:25

26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode, Middle channel



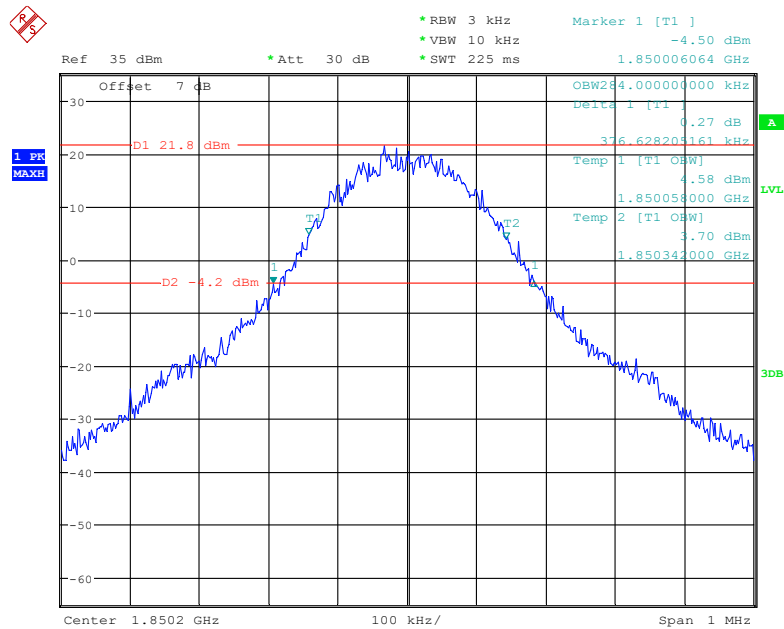
Date: 22.DEC.2021 17:03:18

26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode, High channel



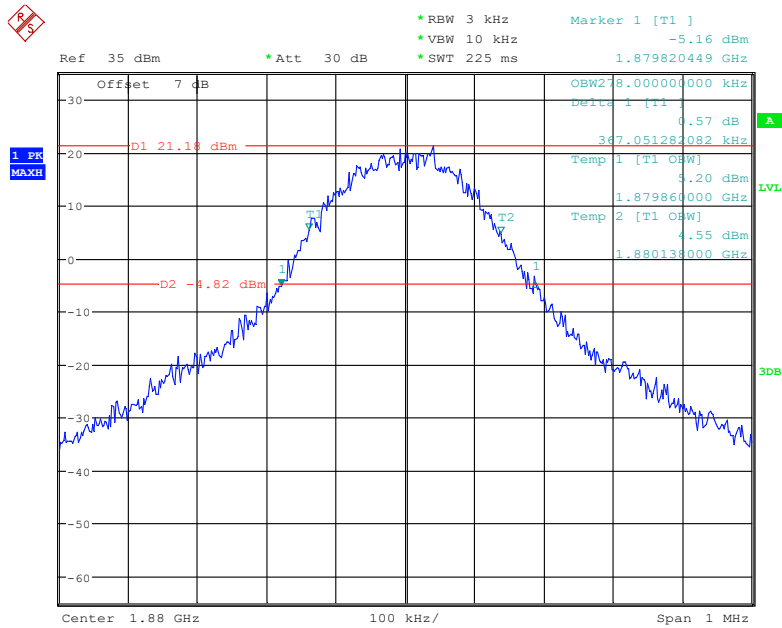
Date: 22.DEC.2021 17:05:16

26 dB Emissions & 99% Occupied Bandwidth for EGPRS (8PSK) Mode, Low channel



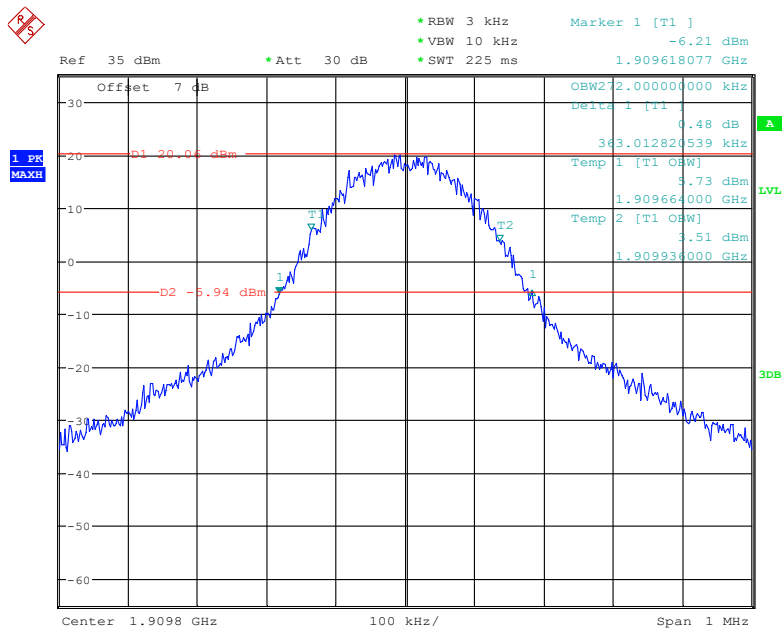
Date: 22.DEC.2021 17:07:57

26 dB Emissions & 99% Occupied Bandwidth for EGPRS (8PSK) Mode, Middle channel



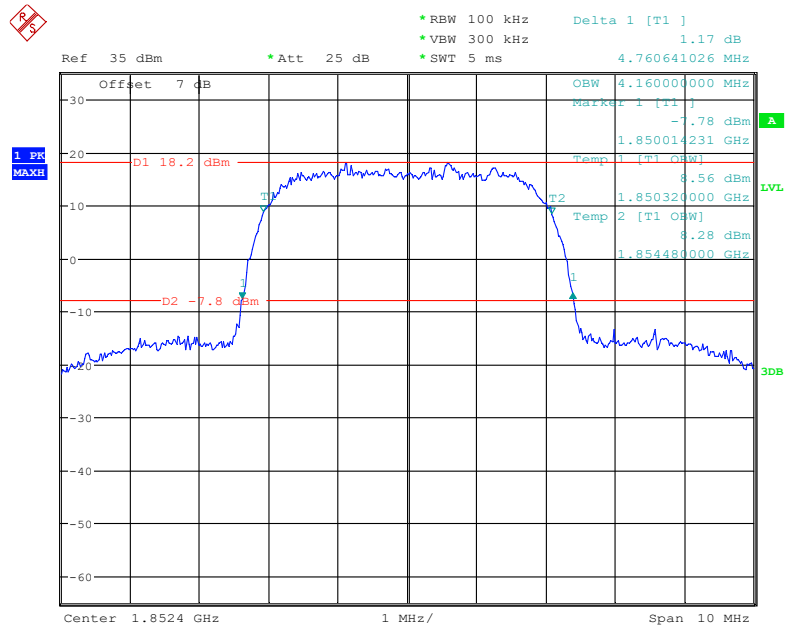
Date: 22.DEC.2021 17:10:04

26 dB Emissions & 99% Occupied Bandwidth for EGPRS (8PSK) Mode, High channel



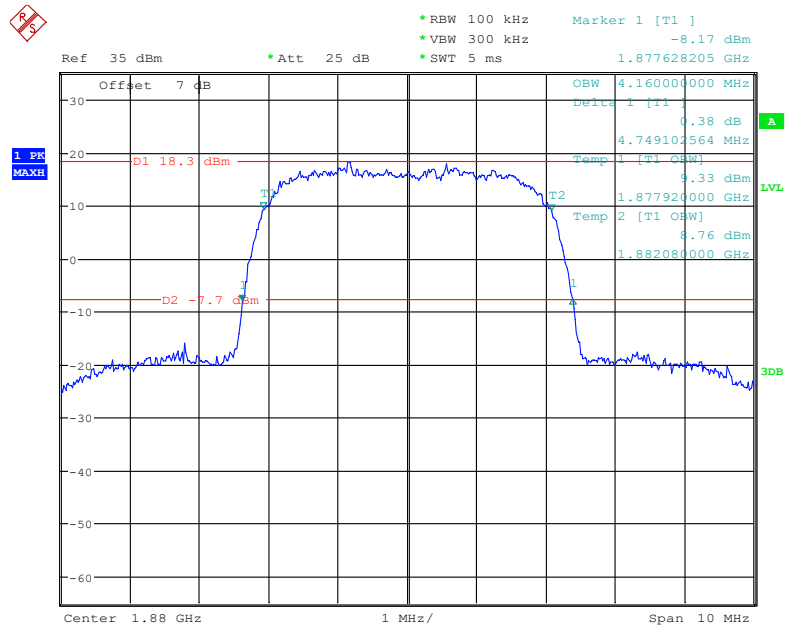
Date: 22.DEC.2021 17:11:35

26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel



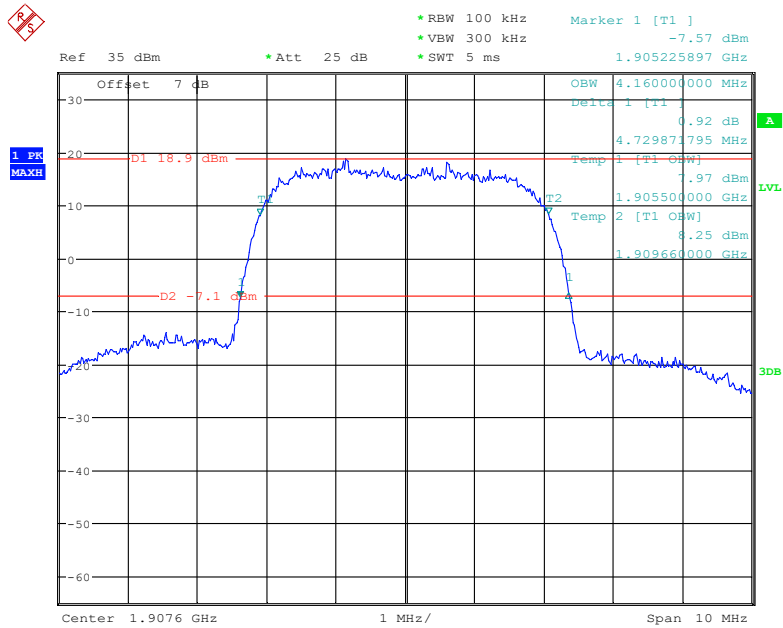
Date: 22.DEC.2021 18:39:42

26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel



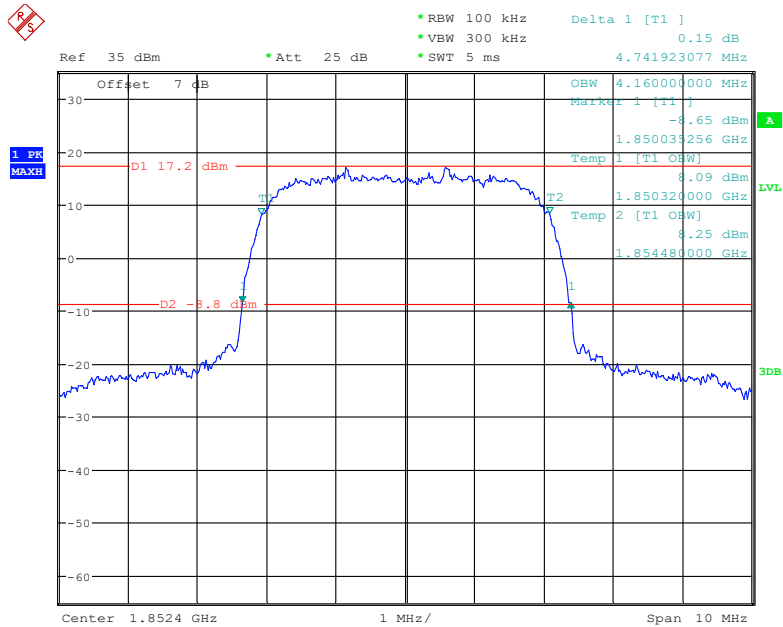
Date: 22.DEC.2021 18:40:45

26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, High channel



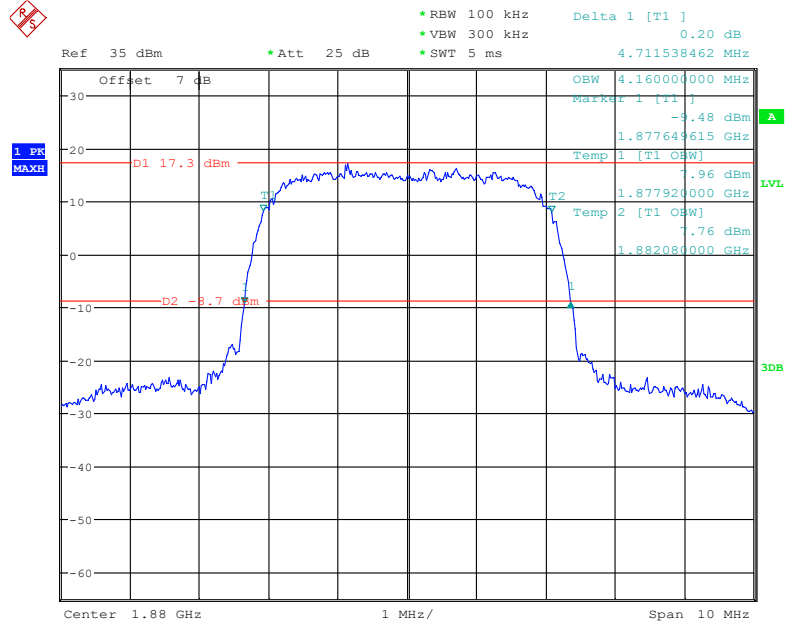
Date: 22.DEC.2021 18:42:00

26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode, Low channel



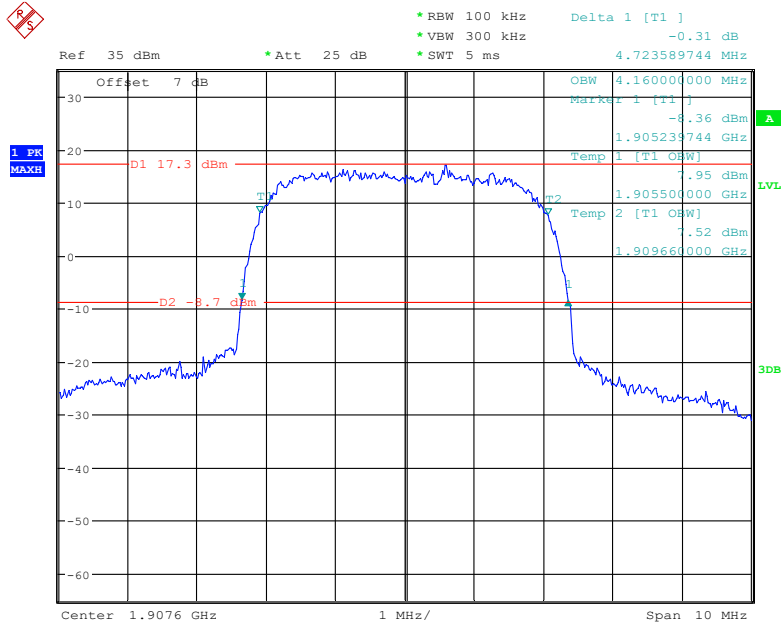
Date: 22.DEC.2021 18:58:12

26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode, Middle channel



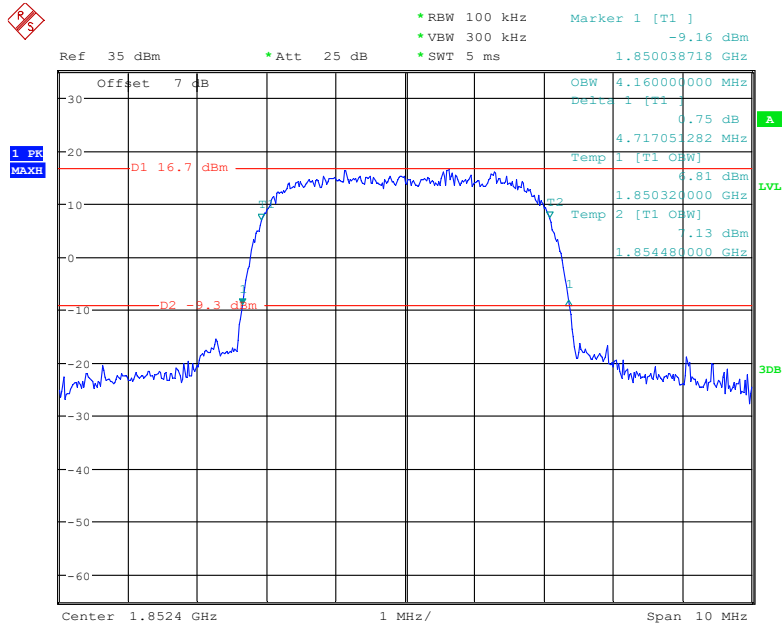
Date: 22.DEC.2021 18:59:21

26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode, High channel



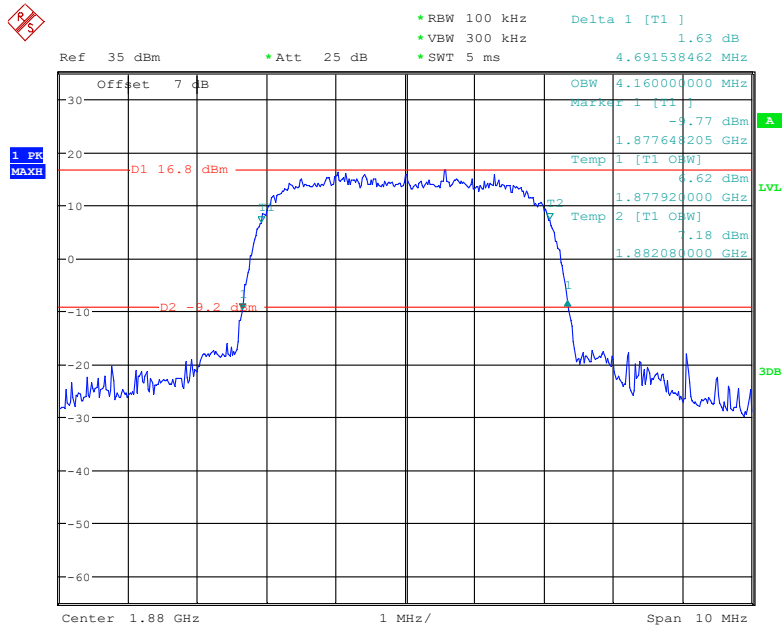
Date: 22.DEC.2021 19:00:38

26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel



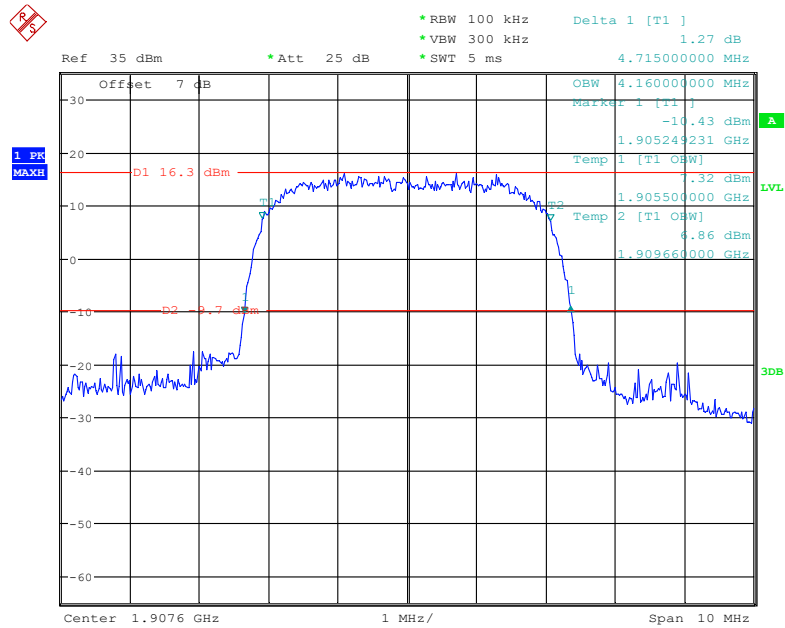
Date: 22.DEC.2021 18:44:26

26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel



Date: 22.DEC.2021 18:45:32

26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel



Date: 22.DEC.2021 18:46:27

LTE Band 2:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4 MHz	QPSK	1.110	1.434	1.110	1.332	1.110	1.428
	16QAM	1.104	1.440	1.104	1.326	1.116	1.344
3 MHz	QPSK	2.700	2.940	2.688	2.904	2.688	2.988
	16QAM	2.688	2.904	2.688	2.904	2.688	2.892
5 MHz	QPSK	4.540	5.360	4.520	5.020	4.520	5.020
	16QAM	4.520	4.960	4.540	5.000	4.520	5.200
10 MHz	QPSK	9.000	9.800	8.960	9.800	8.960	9.640
	16QAM	9.000	9.680	8.960	9.640	8.960	9.600
15 MHz	QPSK	13.560	14.940	13.500	14.880	13.620	14.880
	16QAM	13.620	14.940	13.560	14.880	13.560	14.880
20 MHz	QPSK	18.000	19.528	18.000	19.541	18.000	19.481
	16QAM	18.000	19.538	18.000	19.339	18.000	19.365

LTE Band 5:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4 MHz	QPSK	1.110	1.320	1.110	1.338	1.110	1.332
	16QAM	1.104	1.296	1.104	1.314	1.098	1.284
3 MHz	QPSK	2.700	2.904	2.700	2.916	2.688	2.916
	16QAM	2.700	2.928	2.700	2.904	2.688	2.892
5 MHz	QPSK	4.520	4.980	4.520	5.040	4.520	4.980
	16QAM	4.520	4.980	4.520	4.960	4.520	5.020
10 MHz	QPSK	8.960	9.760	8.960	9.680	8.960	9.560
	16QAM	8.960	9.640	8.960	9.640	8.960	9.640

LTE Band 12:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4 MHz	QPSK	1.104	1.314	1.104	1.314	1.104	1.290
	16QAM	1.110	1.320	1.098	1.284	1.098	1.314
3 MHz	QPSK	2.688	2.880	2.688	2.904	2.688	2.916
	16QAM	2.688	2.892	2.688	2.916	2.688	2.892
5 MHz	QPSK	4.520	4.980	4.520	5.040	4.500	4.920
	16QAM	4.500	4.920	4.540	4.980	4.520	5.000
10 MHz	QPSK	8.960	9.640	8.960	9.640	8.960	9.680
	16QAM	8.960	9.560	8.960	9.640	8.960	9.600

LTE Band 41:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5 MHz	QPSK	4.540	5.380	4.520	5.117	4.520	5.060
	16QAM	4.520	5.120	4.520	5.700	4.520	5.080
10 MHz	QPSK	9.000	9.760	8.960	9.880	9.000	9.560
	16QAM	9.000	9.760	8.960	9.560	8.960	9.760
15 MHz	QPSK	13.560	16.320	13.500	15.180	13.620	16.320
	16QAM	13.560	16.500	13.620	16.680	13.620	15.900
20 MHz	QPSK	18.000	20.080	18.000	21.200	18.000	21.120
	16QAM	18.000	19.920	18.000	20.328	18.000	21.040

The test plots of LTE band please refer to the Appendix A.

FCC §2.1051, §22.917(a) & §24.238(a) & §27.53 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

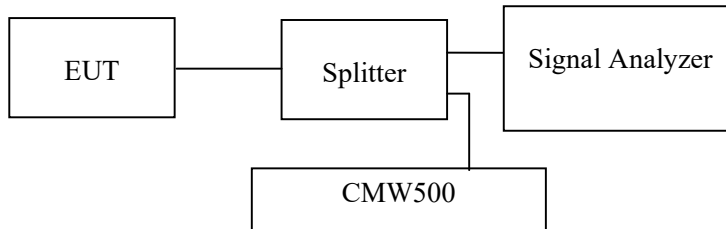
Applicable Standard

FCC §2.1051, §22.917(a) & §24.238(a) & §27.53.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Data

Environmental Conditions

Temperature:	27.2 °C
Relative Humidity:	56.8 %
ATM Pressure:	101.0 kPa

The testing was performed by Gala Liu from 2021-12-22 to 2022-01-27

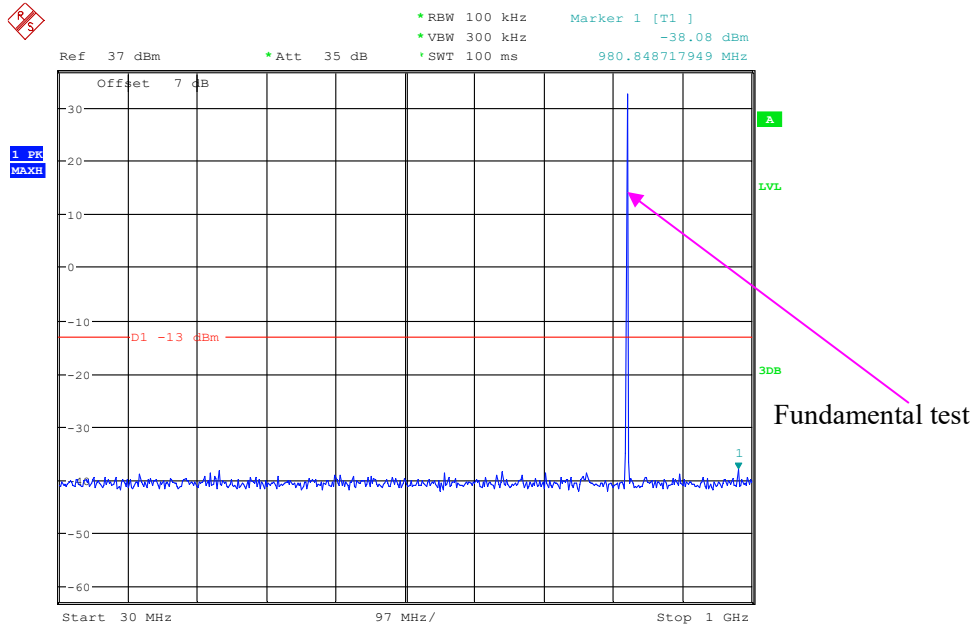
EUT operation mode: Transmitting

Test result: Pass

Please refer to the following plots.

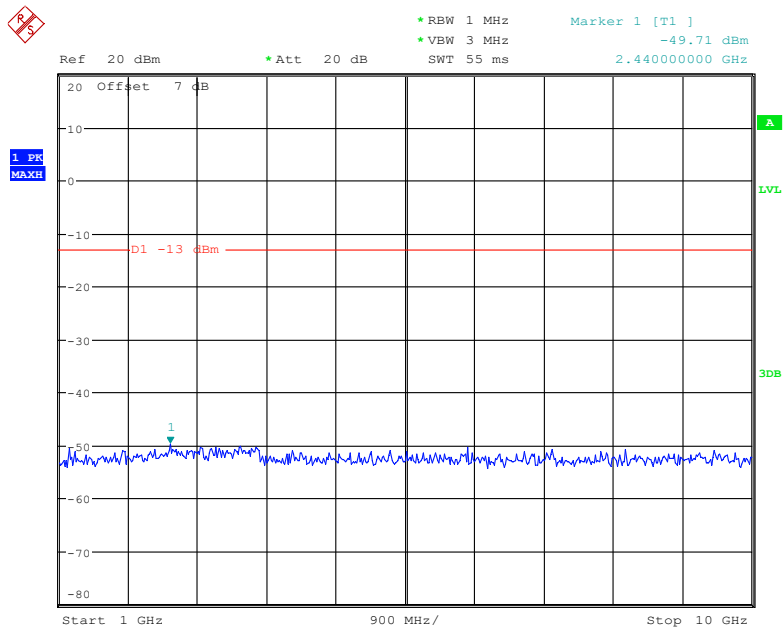
**Cellular Band (Part 22H)
Low Channel:**

30 MHz – 1 GHz (GSM Mode)



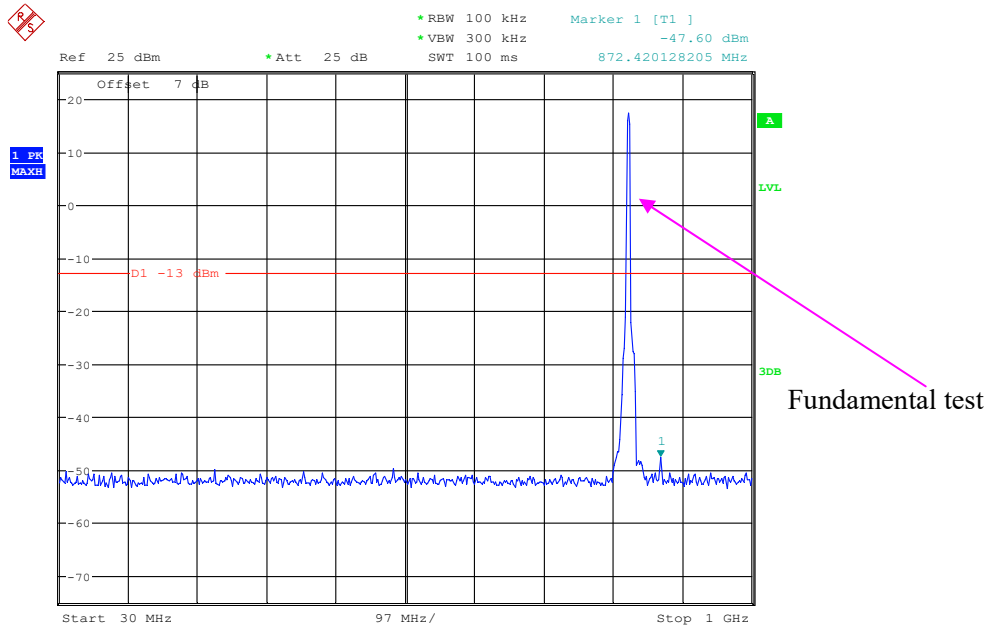
Date: 22.DEC.2021 17:21:07

1 GHz – 10 GHz (GSM Mode)



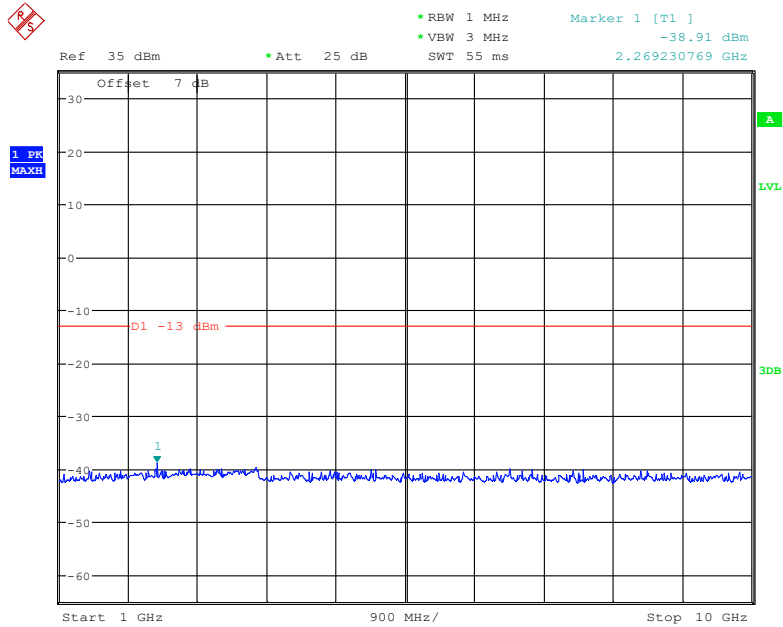
Date: 11.JAN.2022 17:42:22

30 MHz – 1 GHz (WCDMA Mode)



Date: 22.DEC.2021 19:40:18

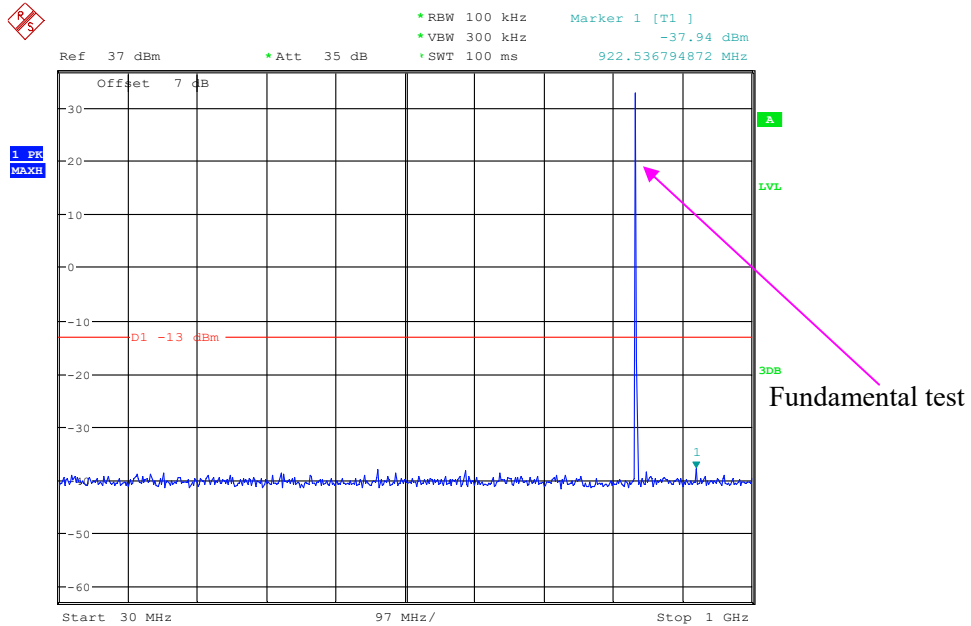
1 GHz – 10 GHz (WCDMA Mode)



Date: 27.JAN.2022 09:52:38

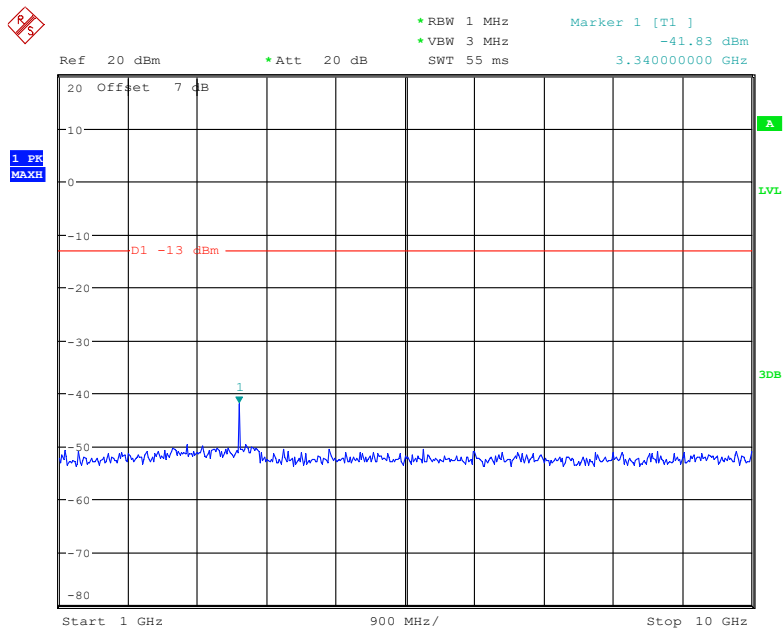
Middle Channel:

30 MHz – 1 GHz (GSM Mode)



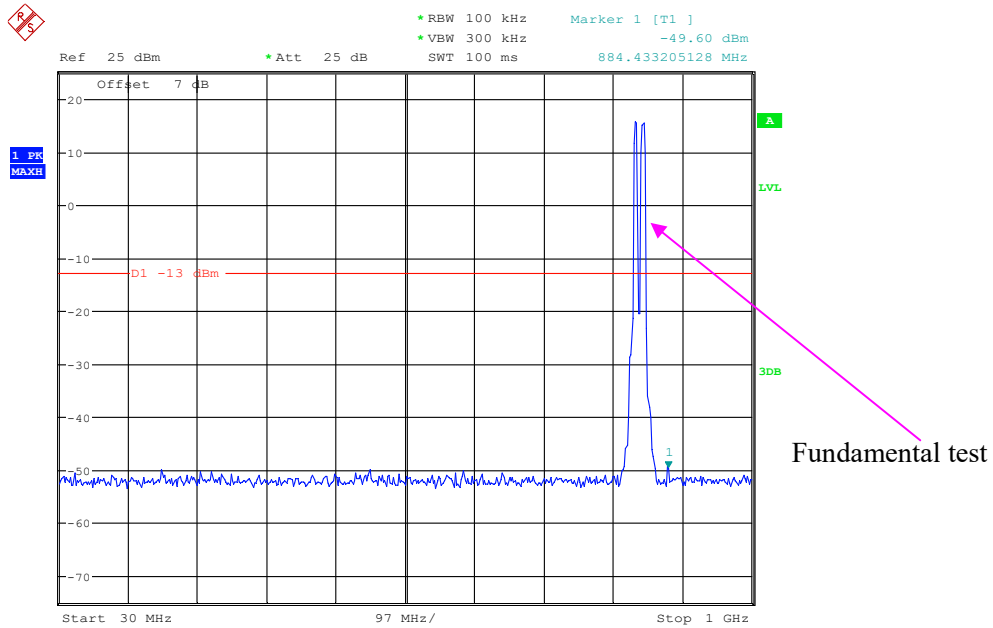
Date: 22.DEC.2021 17:21:53

1 GHz – 10 GHz (GSM Mode)



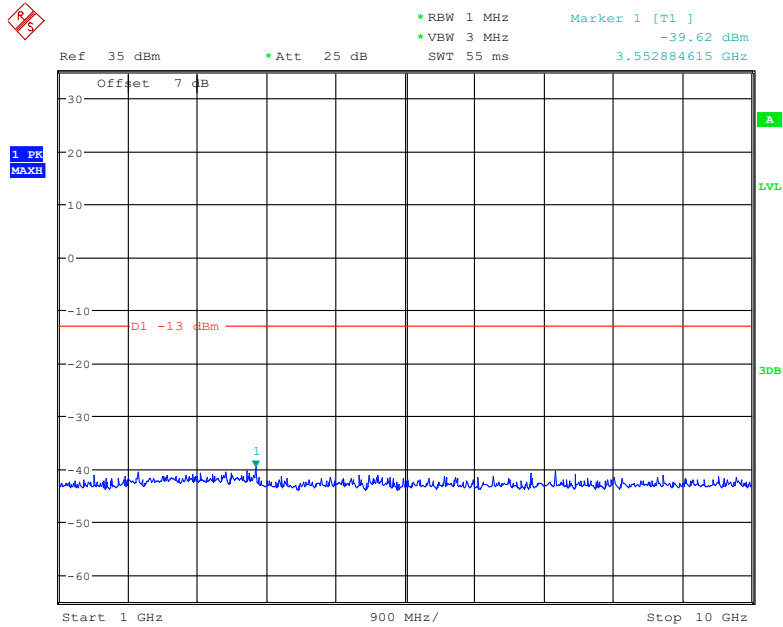
Date: 11.JAN.2022 17:43:11

30 MHz – 1 GHz (WCDMA Mode)



Date: 22.DEC.2021 19:39:41

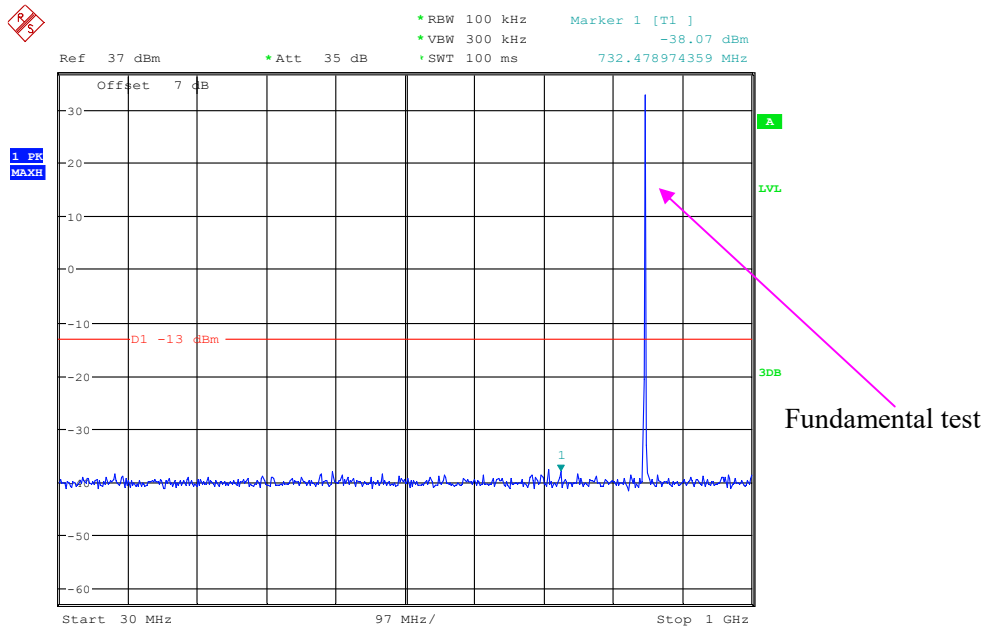
1 GHz – 10 GHz (WCDMA Mode)



Date: 27.JAN.2022 09:53:12

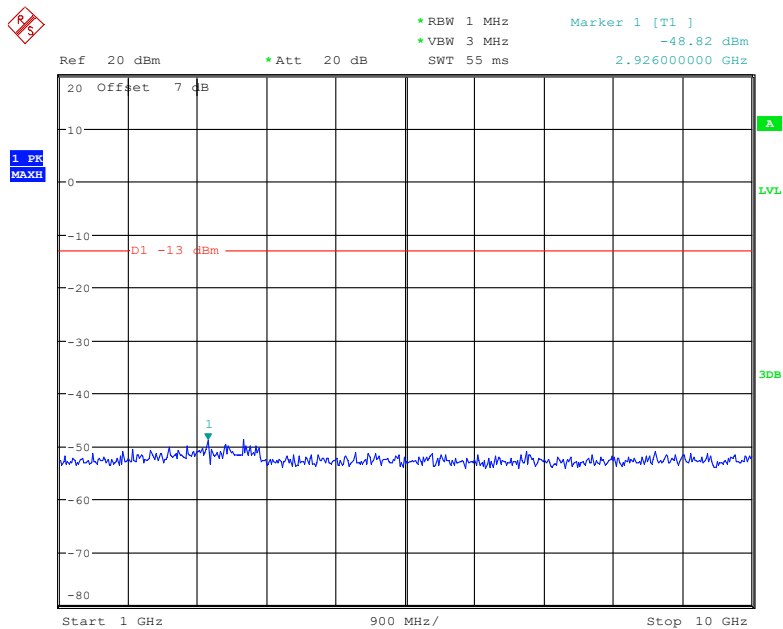
High Channel:

30 MHz – 1 GHz (GSM Mode)



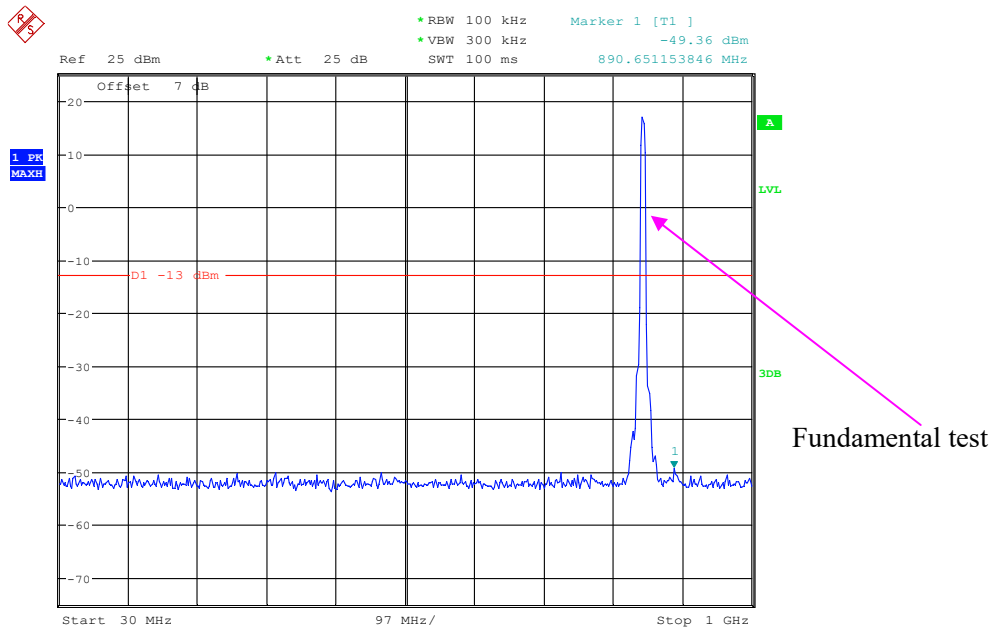
Date: 22.DEC.2021 17:22:24

1 GHz – 10 GHz (GSM Mode)



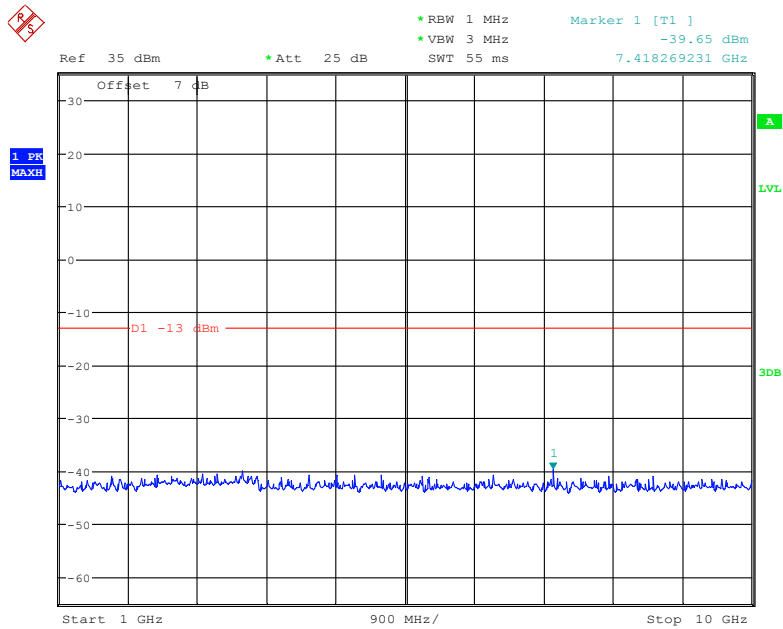
Date: 11.JAN.2022 17:44:15

30 MHz – 1 GHz (WCDMA Mode)



Date: 22.DEC.2021 19:39:08

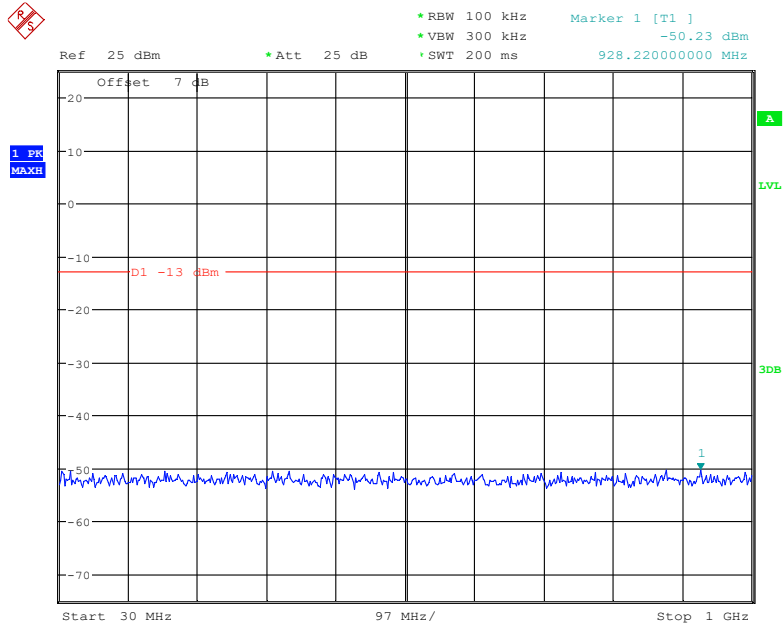
1 GHz – 10 GHz (WCDMA Mode)



Date: 27.JAN.2022 09:53:31

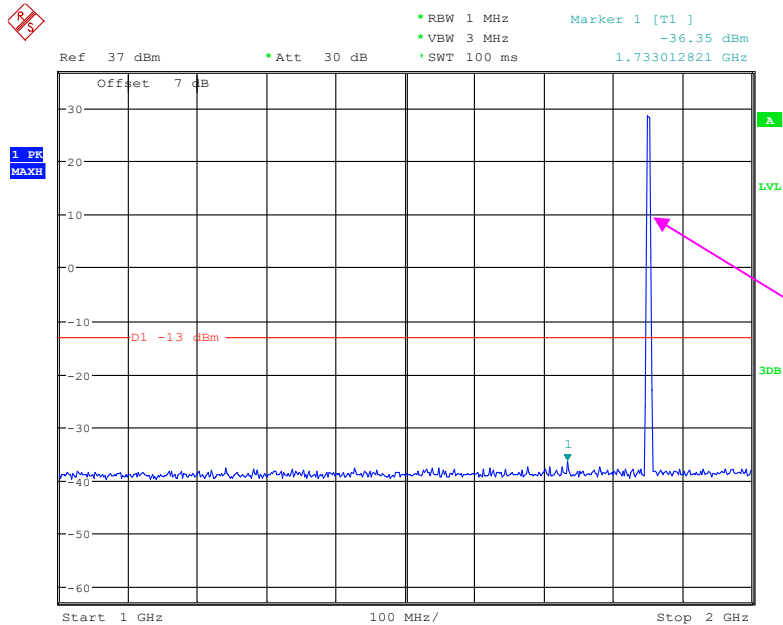
**PCS Band (Part 24E)
Low Channel:**

30 MHz – 1 GHz (GSM Mode)



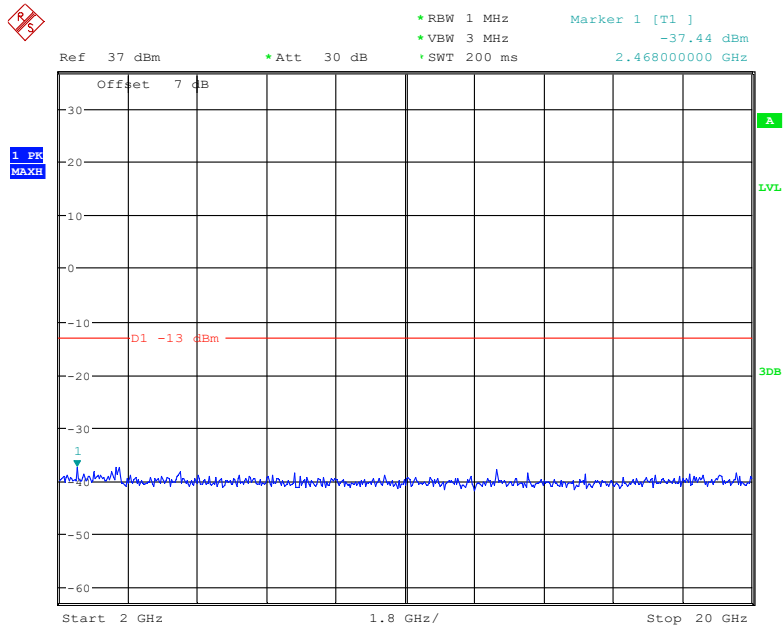
Date: 22.DEC.2021 17:38:32

1 GHz – 2 GHz (GSM Mode)



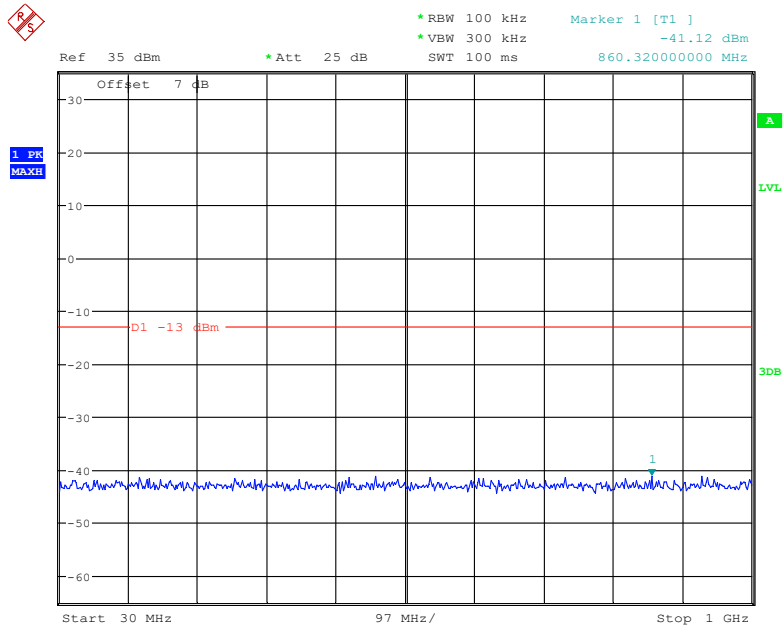
Date: 22.DEC.2021 17:31:37

2 GHz – 20 GHz (GSM Mode)



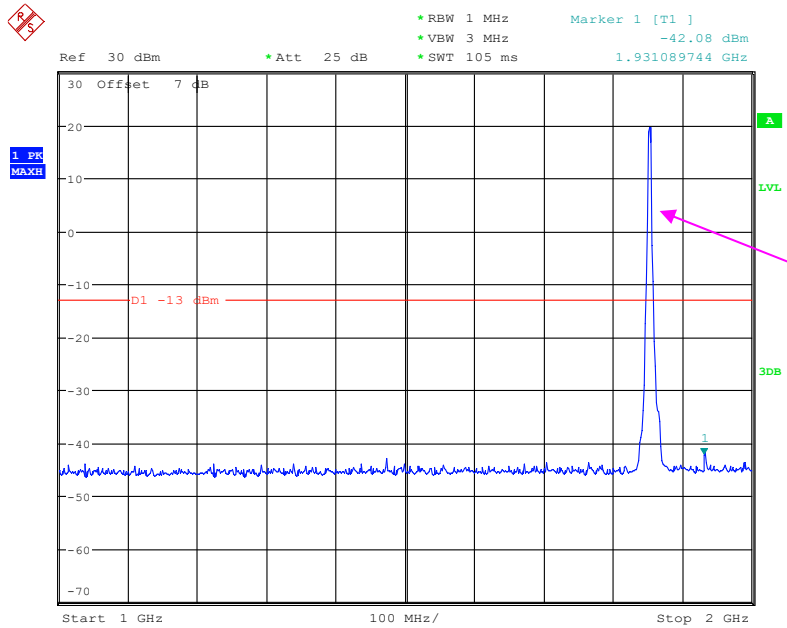
Date: 22.DEC.2021 17:37:21

30 MHz – 1 GHz (WCDMA Mode)



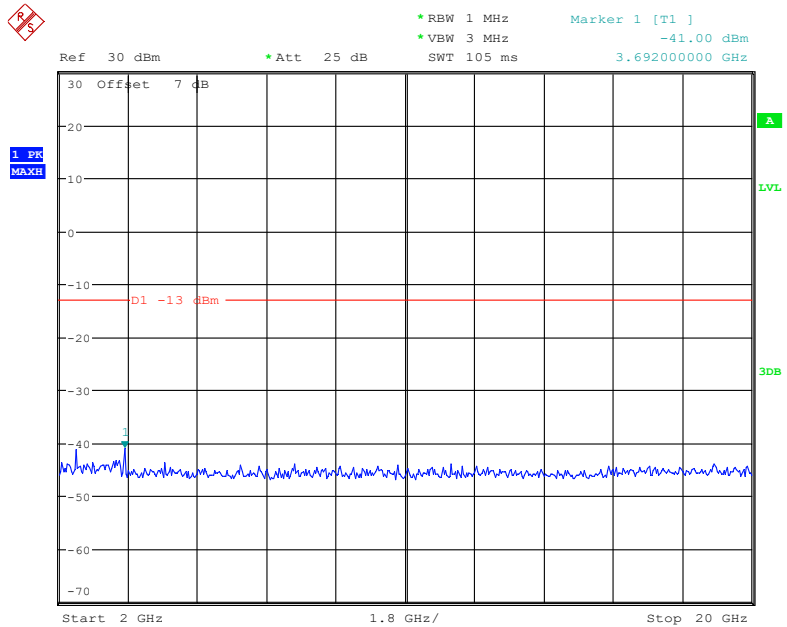
Date: 22.DEC.2021 19:15:19

1 GHz – 2 GHz (WCDMA Mode)



Date: 27.JAN.2022 09:55:18

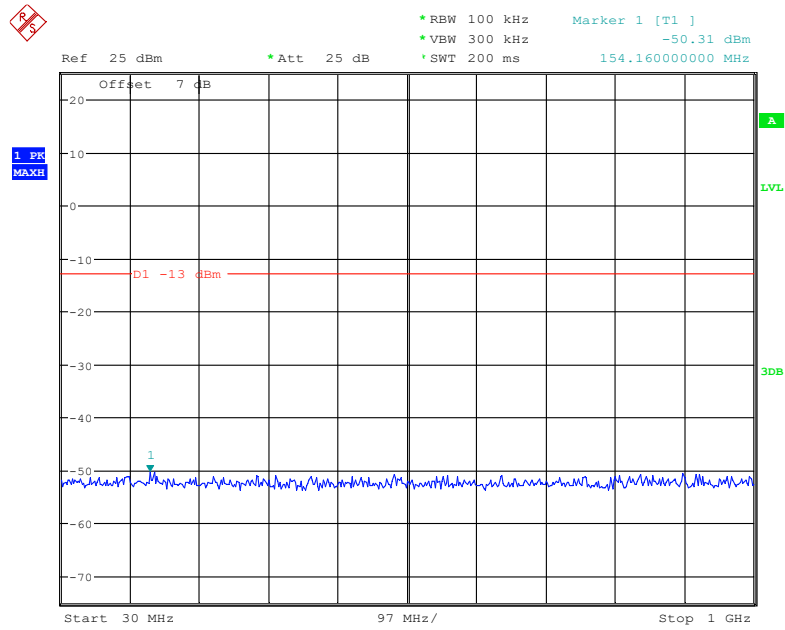
2 GHz – 20 GHz (WCDMA Mode)



Date: 12.JAN.2022 08:54:11

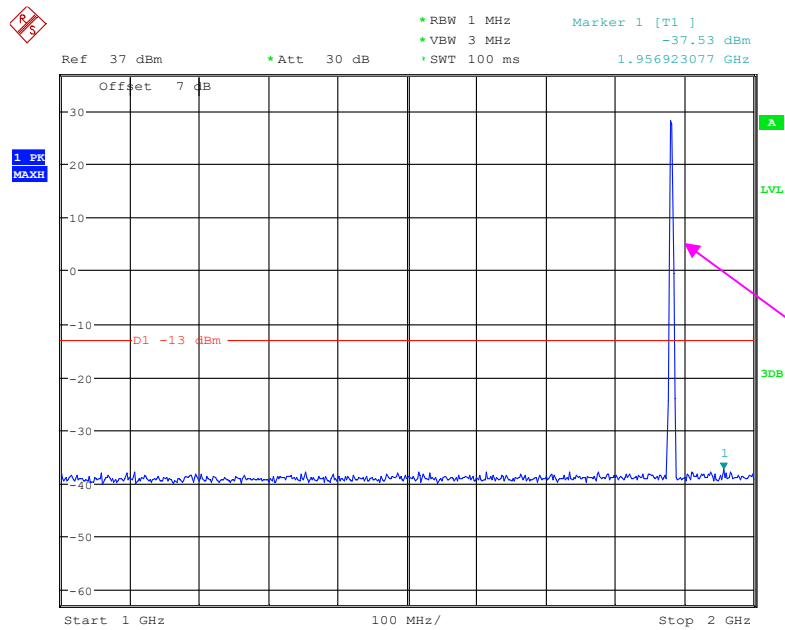
Middle Channel:

30 MHz – 1 GHz (GSM Mode)



Date: 22.DEC.2021 17:38:53

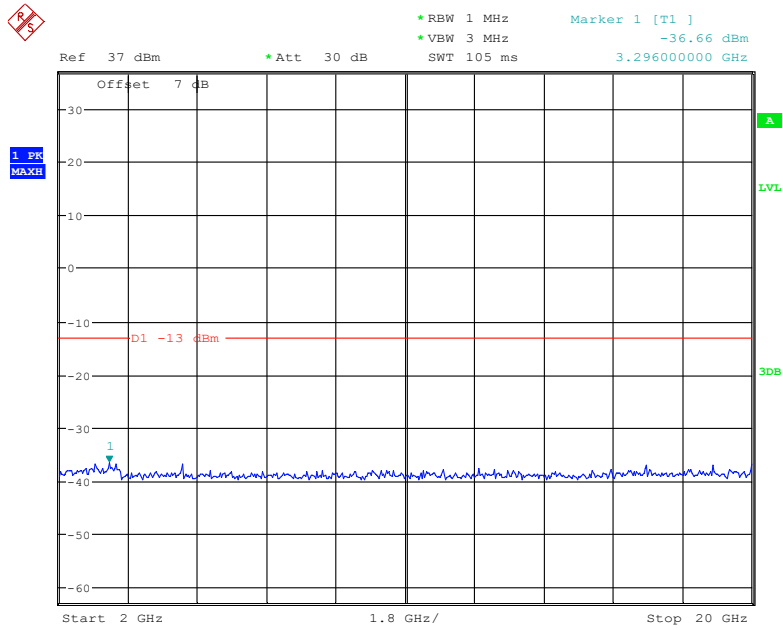
1 GHz – 2 GHz (GSM Mode)



Fundamental test

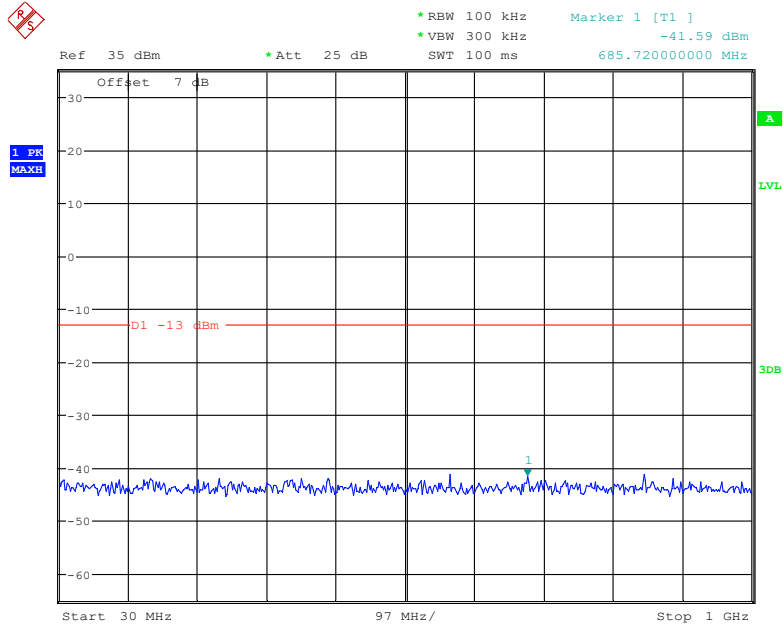
Date: 22.DEC.2021 17:32:21

2 GHz – 20 GHz (GSM Mode)



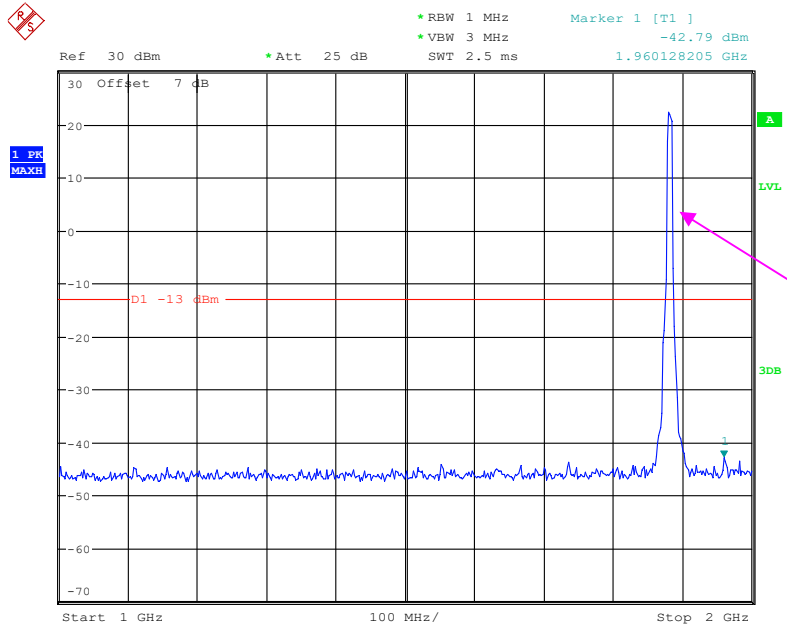
Date: 11.JAN.2022 17:36:56

30 MHz – 1 GHz (WCDMA Mode)



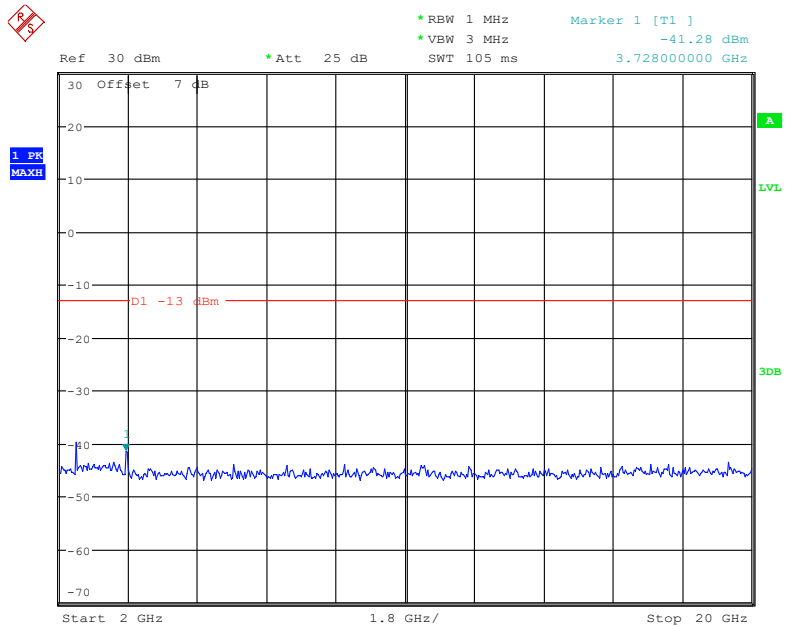
Date: 22.DEC.2021 19:15:52

1 GHz – 2 GHz (WCDMA Mode)



Date: 22.DEC.2021 19:20:24

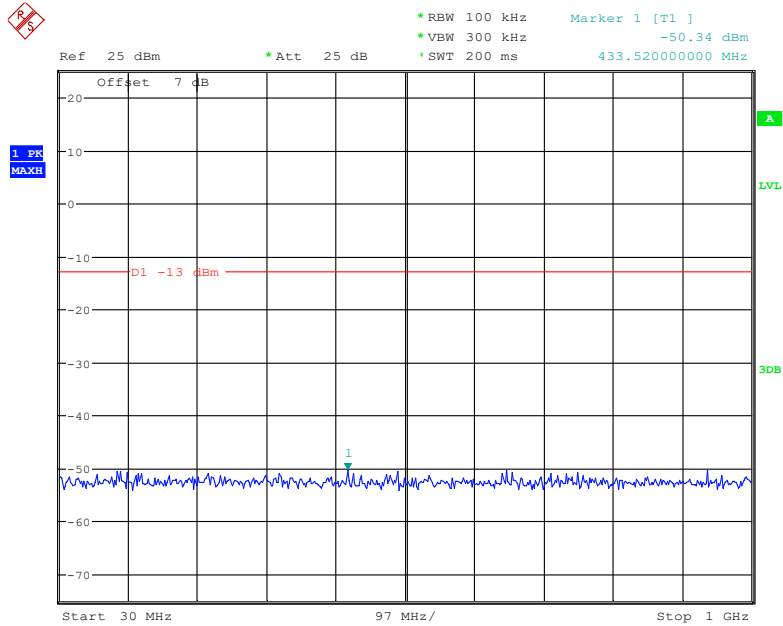
2 GHz – 20 GHz (WCDMA Mode)



Date: 12.JAN.2022 08:56:24

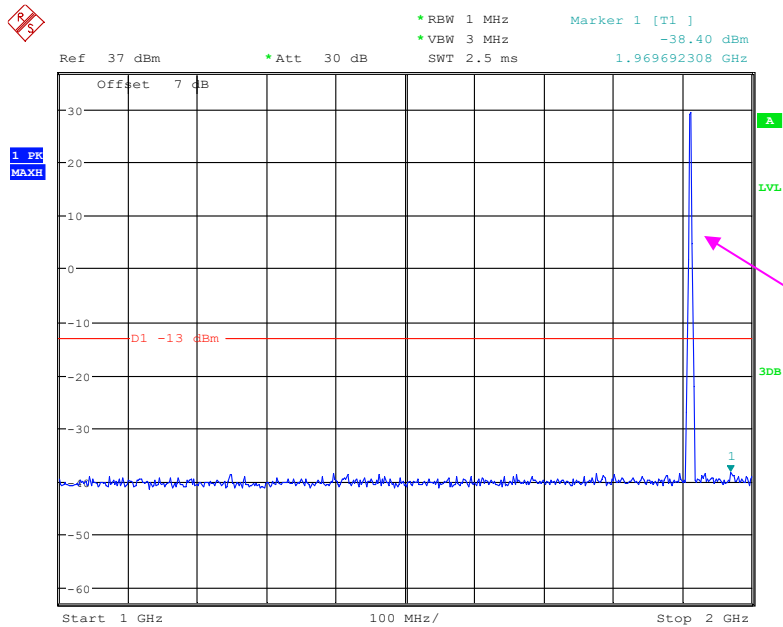
High Channel:

30 MHz – 1 GHz (GSM Mode)



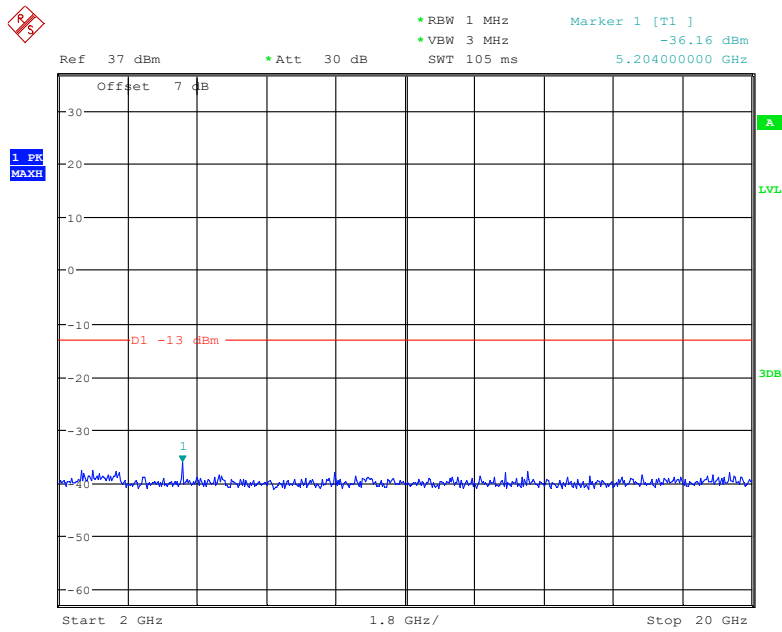
Date: 22.DEC.2021 17:39:14

1 GHz – 2 GHz (GSM Mode)



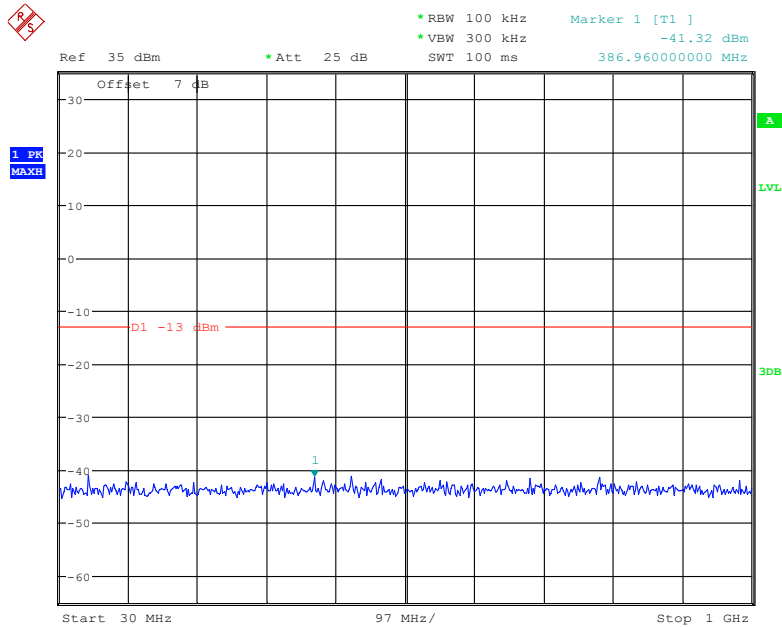
Date: 11.JAN.2022 17:37:41

2 GHz – 20 GHz (GSM Mode)



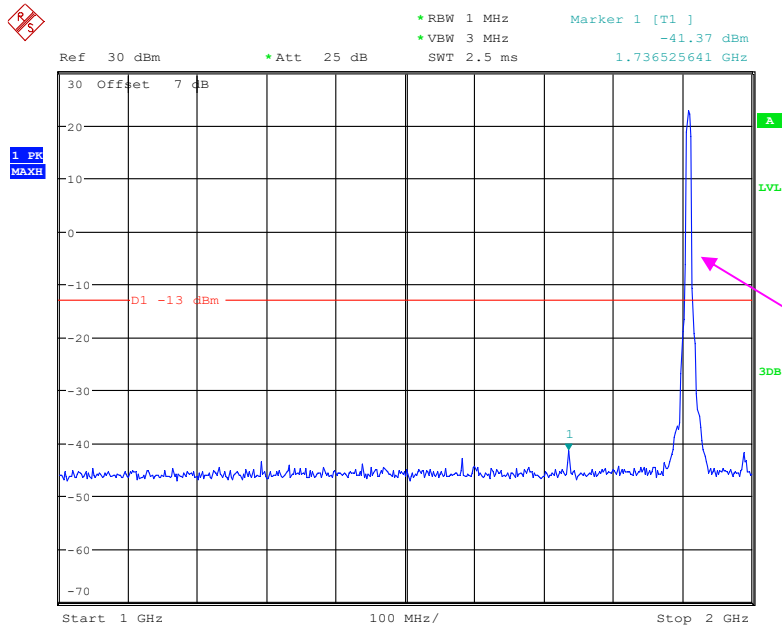
Date: 11.JAN.2022 17:46:40

30 MHz – 1 GHz (WCDMA Mode)



Date: 22.DEC.2021 19:16:05

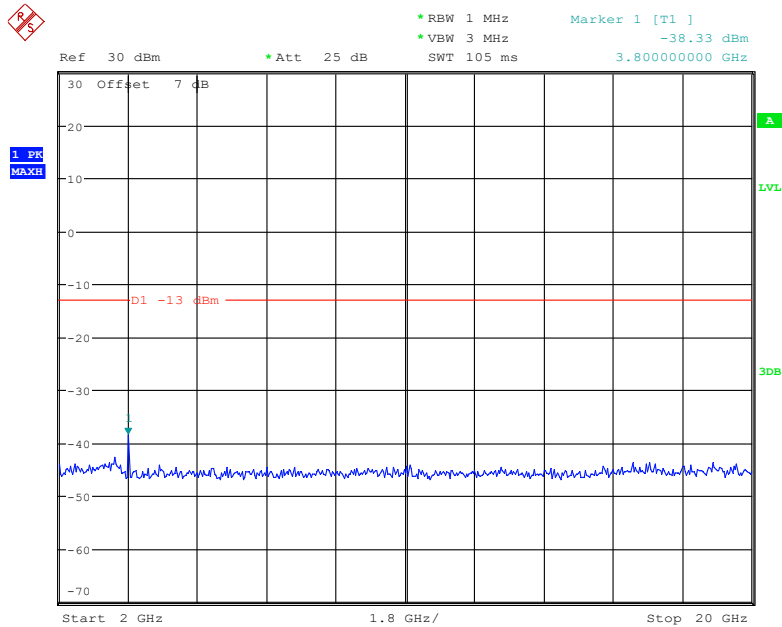
1 GHz – 2 GHz (WCDMA Mode)



Fundamental test

Date: 22.DEC.2021 19:18:47

2GHz – 20 GHz (WCDMA Mode)



Date: 12.JAN.2022 08:53:24

The test plots of LTE band please refer to the Appendix B.

FCC § 2.1053; § 22.917 (a); § 24.238 (a); § 27.53 - SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC § 2.1053, § 22.917(a) & § 24.238(a) & § 27.53.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the receiving antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Test Data

Environmental Conditions

Temperature:	21~25.5 °C
Relative Humidity:	50~62 %
ATM Pressure:	101.0 kPa

The testing was performed by Bin Deng on 2022-01-13 for below 1GHz, on 2022-01-13 and 2022-01-14 for above 1GHz.

EUT operation mode: Transmitting (Scan with X-AXIS, Y-AXIS, Z-AXIS, the worst case was recorded)

The worst case is as below:

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
GSM850								
Test frequency range: 30MHz-10GHz								
Low channel								
45.118	-76.01	23	1.6	H	6.58	-69.43	-13	-56.43
40.276	-61.29	121	2.1	V	2.06	-59.23	-13	-46.23
1648.4	-50.01	14	1.6	H	3.5	-46.51	-13	-33.51
1648.4	-51.82	71	1.7	V	3.1	-48.72	-13	-35.72
2472.6	-44.13	336	1.8	H	6.6	-37.53	-13	-24.53
2472.6	-38.64	224	1.6	V	5.8	-32.84	-13	-19.84
Middle channel								
45.118	-76.37	356	1.3	H	6.58	-69.79	-13	-56.79
40.276	-61.60	240	1.5	V	2.06	-59.54	-13	-46.54
1673.2	-50.12	58	2.0	H	3.8	-46.32	-13	-33.32
1673.2	-47.92	132	2.0	V	3.1	-44.82	-13	-31.82
2509.8	-44.44	7	2.0	H	6.2	-38.24	-13	-25.24
2509.8	-38.91	70	1.6	V	5.6	-33.31	-13	-20.31
High channel								
45.118	-76.37	300	1.6	H	6.58	-69.79	-13	-56.79
40.276	-61.81	233	1.8	V	2.06	-59.75	-13	-46.75
1697.6	-46.32	57	2.0	H	4.1	-42.22	-13	-29.22
1697.6	-40.81	200	2.1	V	3.1	-37.71	-13	-24.71
2546.4	-43.31	12	1.8	H	6.1	-37.21	-13	-24.21
2546.4	-40.34	23	1.9	V	5.8	-34.54	-13	-21.54

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
GSM1900								
Test frequency range: 30MHz-20GHz								
Low channel								
45.118	-76.47	286	1.3	H	6.58	-69.89	-13	-56.89
40.276	-62.04	46	1.3	V	2.06	-59.98	-13	-46.98
3700.4	-55.01	187	1.5	H	8.1	-46.91	-13	-33.91
3700.4	-54.3	7	1.8	V	7.6	-46.7	-13	-33.7
5550.6	-43.8	271	1.7	H	9.6	-34.2	-13	-21.2
5550.6	-45.62	192	2.0	V	9.1	-36.52	-13	-23.52
Middle channel								
45.118	-76.34	181	1.7	H	6.58	-69.76	-13	-56.76
40.276	-61.64	148	1.7	V	2.06	-59.58	-13	-46.58
3760	-55.54	38	1.9	H	8.8	-46.74	-13	-33.74
3760	-54.65	71	1.8	V	8	-46.65	-13	-33.65
5640	-48.61	335	1.9	H	10.2	-38.41	-13	-25.41
5640	-46.4	276	1.9	V	9.4	-37	-13	-24
High channel								
45.118	-76.44	191	2.2	H	6.58	-69.86	-13	-56.86
40.276	-61.95	262	1.0	V	2.06	-59.89	-13	-46.89
3819.6	-55.92	229	1.9	H	8.7	-47.22	-13	-34.22
3819.6	-54.23	108	1.8	V	8	-46.23	-13	-33.23
5729.4	-45.27	1	1.7	H	10.6	-34.67	-13	-21.67
5729.4	-46.76	47	1.8	V	10.2	-36.56	-13	-23.56

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
WCDMA Band 2								
Test frequency range: 30MHz-20GHz								
Low channel								
45.118	-76.82	153	1.1	H	6.58	-70.24	-13	-57.24
40.276	-62.32	244	1.1	V	2.06	-60.26	-13	-47.26
3704.8	-60.81	208	1.5	H	8.8	-52.01	-13	-39.01
3704.8	-58.72	172	1.9	V	7.9	-50.82	-13	-37.82
5557.2	-53.35	104	2.0	H	9.7	-43.65	-13	-30.65
5557.2	-50.2	138	1.6	V	9.1	-41.1	-13	-28.1
Middle channel								
45.118	-77.26	250	1.0	H	6.58	-70.68	-13	-57.68
40.276	-62.95	24	1.3	V	2.06	-60.89	-13	-47.89
3760	-61.64	146	1.5	H	8.8	-52.84	-13	-39.84
3760	-58.54	5	1.9	V	8	-50.54	-13	-37.54
5557.2	-52.23	335	1.8	H	10.2	-42.03	-13	-29.03
5557.2	-52.16	171	1.7	V	9.4	-42.76	-13	-29.76
High channel								
45.118	-76.97	136	1.1	H	6.58	-70.39	-13	-57.39
40.276	-62.05	12	1.5	V	2.06	-59.99	-13	-46.99
3815.2	-60.81	191	2.0	H	8.7	-52.11	-13	-39.11
3815.2	-58.79	191	2.0	V	7.9	-50.89	-13	-37.89
5722.8	-53.19	224	1.9	H	10.6	-42.59	-13	-29.59
5722.8	-53	84	1.8	V	10.1	-42.9	-13	-29.9

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
WCDMA Band 5								
Test frequency range: 30MHz-10GHz								
Low channel								
45.118	-77.47	16	1.0	H	6.58	-70.89	-13	-57.89
40.276	-62.74	235	2.0	V	2.06	-60.68	-13	-47.68
1652.8	-53.83	241	1.6	H	3.5	-50.33	-13	-37.33
1652.8	-52.51	304	1.9	V	3.1	-49.41	-13	-36.41
2479.2	-47.73	24	1.7	H	6.5	-41.23	-13	-28.23
2479.2	-46.29	193	2.1	V	5.7	-40.59	-13	-27.59
Middle channel								
45.118	-76.94	86	2.0	H	6.58	-70.36	-13	-57.36
40.276	-62.32	195	1.3	V	2.06	-60.26	-13	-47.26
1673.2	-54.26	304	2.0	H	3.8	-50.46	-13	-37.46
1673.2	-53.07	165	1.9	V	3.1	-49.97	-13	-36.97
2509.8	-46.32	347	1.7	H	6.2	-40.12	-13	-27.12
2509.8	-45.47	212	2.1	V	5.7	-39.77	-13	-26.77
High channel								
45.118	-77.07	17	1.1	H	6.58	-70.49	-13	-57.49
40.276	-62.92	108	2.1	V	2.06	-60.86	-13	-47.86
1693.2	-55.82	31	1.5	H	4	-51.82	-13	-38.82
1693.2	-52.71	333	2.1	V	3.1	-49.61	-13	-36.61
2539.8	-47.24	57	1.7	H	6.1	-41.14	-13	-28.14
2539.8	-44.78	221	2.1	V	5.7	-39.08	-13	-26.08

LTE Bands: (pre-scan all bandwidths, the worst case as below)

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band 2								
Test frequency range: 30MHz-20GHz								
1.4MHz, Low channel								
45.118	-77.04	31	1.8	H	6.58	-70.46	-13	-57.46
40.276	-62.42	287	1.7	V	2.06	-60.36	-13	-47.36
3701.40	-58.83	207	1.8	H	8.1	-50.73	-13	-37.73
3701.40	-56.87	152	1.8	V	7.6	-49.27	-13	-36.27
5552.10	-51.36	282	1.7	H	9.6	-41.76	-13	-28.76
5552.1	-51.58	23	1.8	V	9.1	-42.48	-13	-29.48
1.4MHz, Middle channel								
45.118	-76.68	349	1.2	H	6.58	-70.10	-13	-57.10
40.276	-62.95	76	1.8	V	2.06	-60.89	-13	-47.89
3760	-59.02	98	1.8	H	8.8	-50.22	-13	-37.22
3760	-129.32	60	1.5	V	80	-49.32	-13	-36.32
5640	-52.95	168	2.0	H	10.2	-42.75	-13	-29.75
5640	-51.41	355	1.8	V	9.4	-42.01	-13	-29.01
1.4MHz, High channel								
45.118	-77.59	43	1.3	H	6.58	-71.01	-13	-58.01
40.276	-63.04	349	1.6	V	2.06	-60.98	-13	-47.98
3818.60	-59.34	76	1.5	H	8.7	-50.64	-13	-37.64
3818.60	-57.66	209	1.9	V	8	-49.66	-13	-36.66
5727.90	-53.27	272	1.9	H	10.6	-42.67	-13	-29.67
5727.90	-52.36	25	1.7	V	10.2	-42.16	-13	-29.16

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band 5								
Test frequency range: 30MHz-20GHz								
1.4MHz, Low channel								
45.118	-77.74	7	1.9	H	6.58	-71.16	-13	-58.16
40.276	-62.32	279	1.9	V	2.06	-60.26	-13	-47.26
1649.4	-54.05	271	2.0	H	3.2	-50.85	-13	-37.85
1649.4	-53.63	239	2.0	V	3.1	-50.53	-13	-37.53
2474.1	-47.06	94	1.6	H	6.6	-40.46	-13	-27.46
2474.1	-46.71	293	2.0	V	5.8	-40.91	-13	-27.91
1.4MHz, Middle channel								
45.118	-77.52	170	2.1	H	6.58	-70.94	-13	-57.94
40.276	-63.04	9	2.1	V	2.06	-60.98	-13	-47.98
1673	-54.93	265	1.9	H	3.8	-51.13	-13	-38.13
1673	-53.23	196	1.7	V	3.1	-50.13	-13	-37.13
2509.5	-47.99	72	1.5	H	6.2	-41.79	-13	-28.79
2509.5	-45.56	159	2.1	V	5.6	-39.96	-13	-26.96
1.4MHz, High channel								
45.118	-78.00	266	1.4	H	6.58	-71.42	-13	-58.42
40.276	-62.65	359	2.2	V	2.06	-60.59	-13	-47.59
1696.6	-55.64	163	1.9	H	4.1	-51.54	-13	-38.54
1696.6	-52.64	114	1.8	V	3.1	-49.54	-13	-36.54
2544.9	-46.41	65	1.7	H	6.1	-40.31	-13	-27.31
2544.9	-46.52	242	2.0	V	5.8	-40.72	-13	-27.72

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band 12								
Test frequency range: 30MHz-10GHz								
1.4MHz, Low channel								
45.118	-76.84	345	1.3	H	6.58	-70.26	-13	-57.26
40.276	-61.68	133	2.1	V	2.06	-59.62	-13	-46.62
1399.4	-56.19	107	1.9	H	5.9	-50.29	-13	-37.29
1399.4	-56.7	93	1.9	V	5.9	-50.8	-13	-37.8
2099.1	-48.08	303	1.8	H	6.3	-41.78	-13	-28.78
2099.1	-45	233	1.9	V	5.1	-39.9	-13	-26.9
1.4MHz, Middle channel								
45.118	-77.27	284	1.4	H	6.58	-70.69	-13	-57.69
40.276	-61.84	13	1.8	V	2.06	-59.78	-13	-46.78
1415	-57.31	11	2.0	H	5.7	-51.61	-13	-38.61
1415	-56.28	269	1.9	V	5.4	-50.88	-13	-37.88
2122.5	-47.28	303	1.9	H	6.7	-40.58	-13	-27.58
2122.5	-46.56	22	1.7	V	5.8	-40.76	-13	-27.76
1.4MHz, High channel								
45.118	-77.37	57	1.2	H	6.58	-70.79	-13	-57.79
40.276	-61.42	336	2.1	V	2.06	-59.36	-13	-46.36
1430.6	-56.16	163	1.6	H	5.4	-50.76	-13	-37.76
1430.6	-54.85	349	2.0	V	4.8	-50.05	-13	-37.05
2145.9	-48.81	25	2.1	H	7	-41.81	-13	-28.81
2145.9	-47.2	20	1.7	V	6.6	-40.6	-13	-27.6

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
LTE Band 41								
Test frequency range: 30MHz-26.5GHz								
5MHz, Low channel								
45.118	-77.26	60	1.1	H	6.58	-70.68	-25	-45.68
40.276	-61.62	215	1.9	V	2.06	-59.56	-25	-34.56
4997	-59.63	119	1.8	H	10.8	-48.83	-25	-23.83
4997	-56.89	322	1.9	V	10	-46.89	-25	-21.89
7495.5	-61.84	337	1.6	H	20.3	-41.54	-25	-16.54
7495.5	-57.92	265	2.0	V	19.9	-38.02	-25	-13.02
5MHz, Middle channel								
45.118	-77.44	151	2.0	H	6.58	-70.86	-25	-45.86
40.276	-61.32	121	1.1	V	2.06	-59.26	-25	-34.26
5186	-59.08	91	1.9	H	10.6	-48.48	-25	-23.48
5186	-56.08	347	2.0	V	10.1	-45.98	-25	-20.98
7779	-60.31	215	1.7	H	18.4	-41.91	-25	-16.91
7779	-57.48	318	1.5	V	18.2	-39.28	-25	-14.28
5MHz, High channel								
45.118	-77.25	44	1.6	H	6.58	-70.67	-25	-45.67
40.276	-61.32	298	1.8	V	2.06	-59.26	-25	-34.26
5375	-57.5	203	1.6	H	9.5	-48	-25	-23
5375	-55.03	206	1.6	V	8.9	-46.13	-25	-21.13
8062.5	-61.05	295	1.8	H	19.5	-41.55	-25	-16.55
8062.5	-58.34	110	2.1	V	18.8	-39.54	-25	-14.54

Note:

Absolute Level = Reading Level + Substituted Factor

Substituted Factor contains: SG Level - Cable loss+ Antenna Gain

Margin = Absolute Level - Limit

FCC § 22.917 (a); § 24.238 (a); § 27.53 (c)(h)(m) - BAND EDGES**Applicable Standard**

According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to § 24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to FCC § 27.53 (c), For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

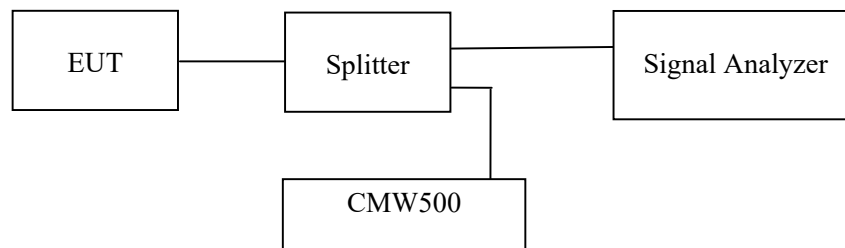
- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log(P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log(P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

According to FCC § 27.53 (h)(m), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency



Test Data**Environmental Conditions**

Temperature:	27.2 °C
Relative Humidity:	56.8 %
ATM Pressure:	101.0 kPa

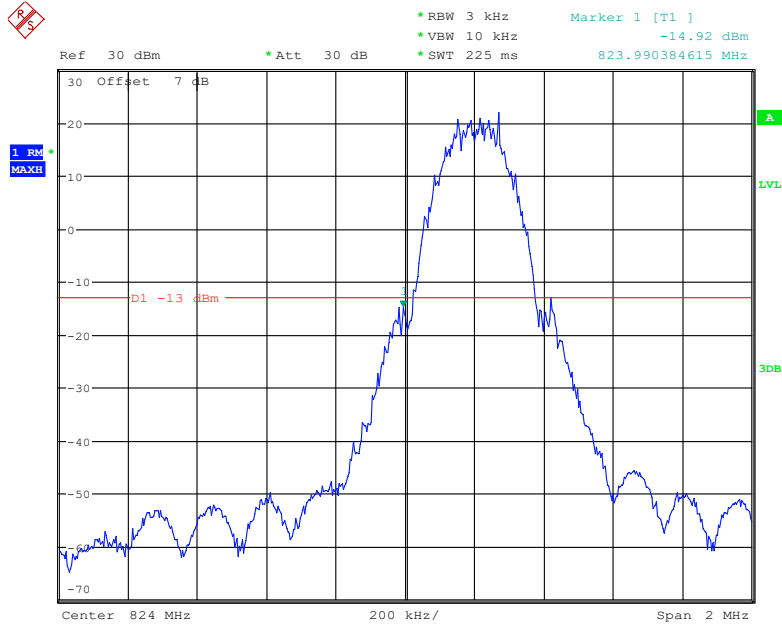
The testing was performed by Gala Liu from 2021-12-22 to 2022-01-27.

EUT operation mode: Transmitting (Worst case)

Test Result: Pass

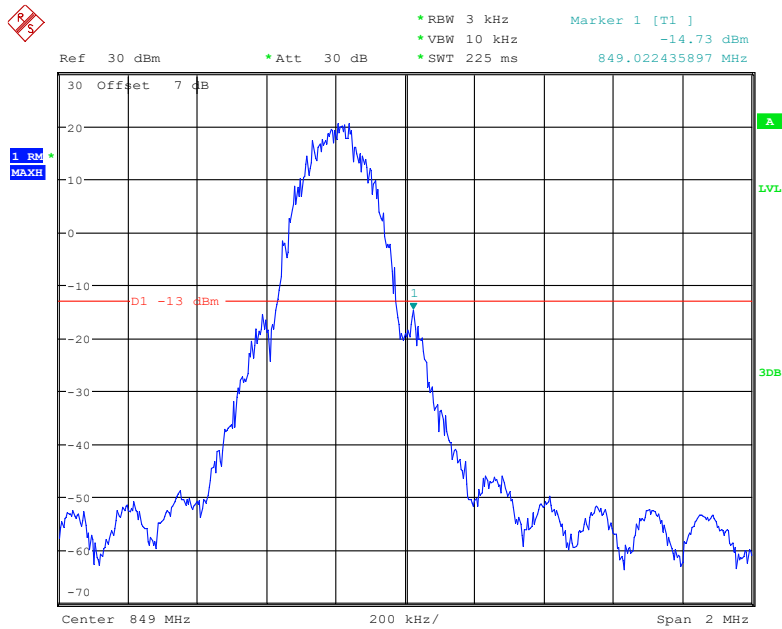
Please refer to the following plots.

Cellular Band, Left Band Edge for GSM (GMSK) Mode



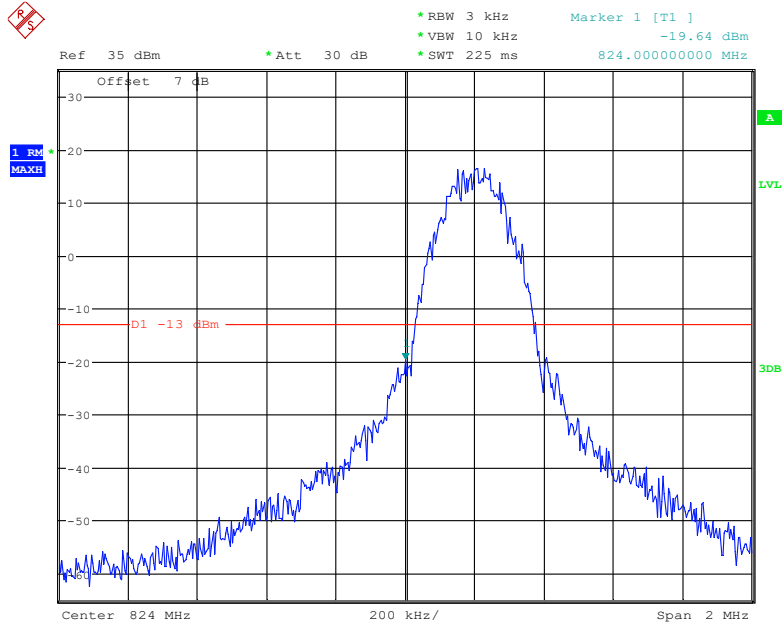
Date: 22.DEC.2021 16:40:54

Cellular Band, Right Band Edge for GSM (GMSK) Mode



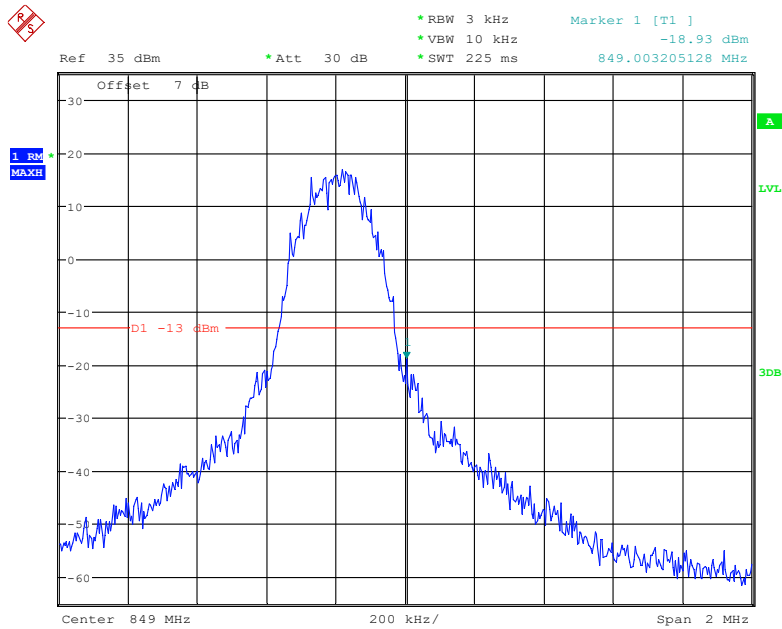
Date: 22.DEC.2021 16:41:44

Cellular Band, Left Band Edge for EGPRS (8PSK) Mode



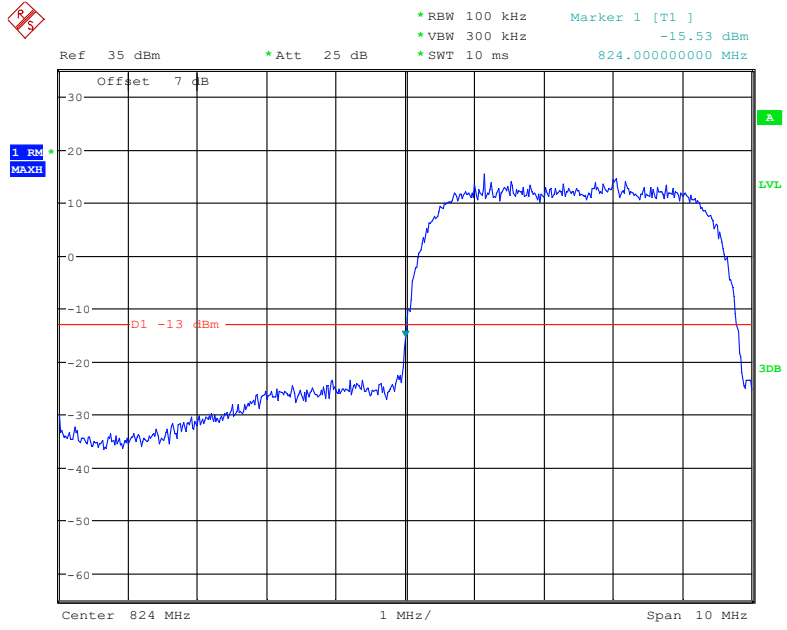
Date: 22.DEC.2021 16:55:13

Cellular Band, Right Band Edge for EGPRS (8PSK) Mode



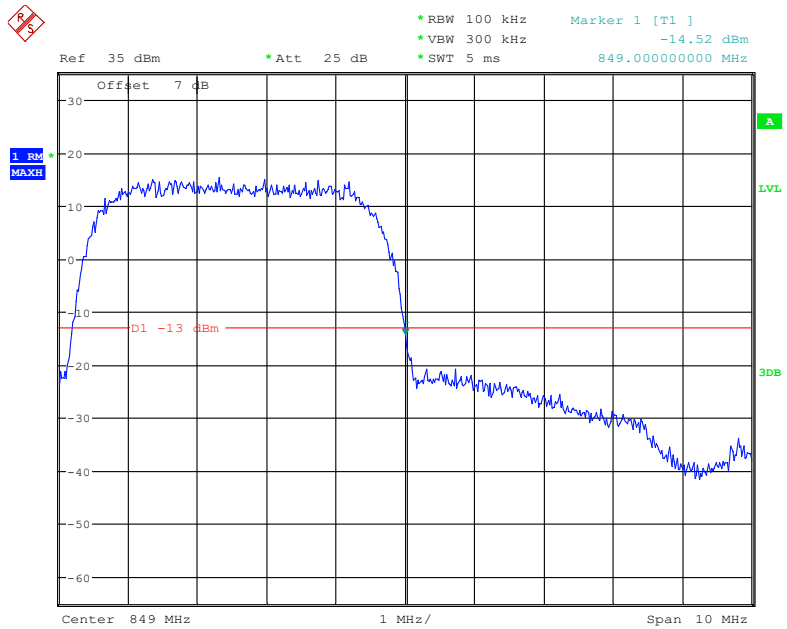
Date: 22.DEC.2021 16:54:31

Cellular Band, Left Band Edge for RMC (BPSK) Mode



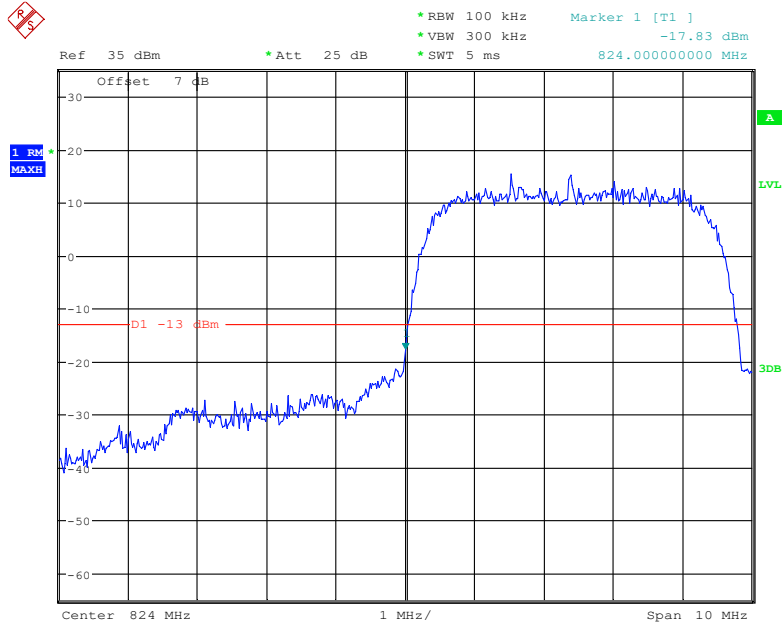
Date: 22.DEC.2021 18:30:23

Cellular Band, Right Band Edge for RMC (BPSK) Mode



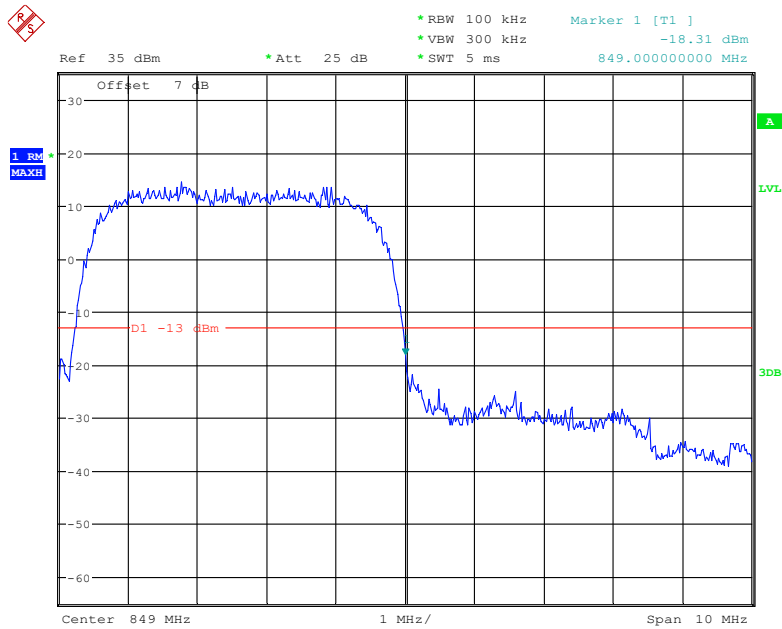
Date: 22.DEC.2021 18:30:49

Cellular Band, Left Band Edge for HSDPA (16QAM) Mode



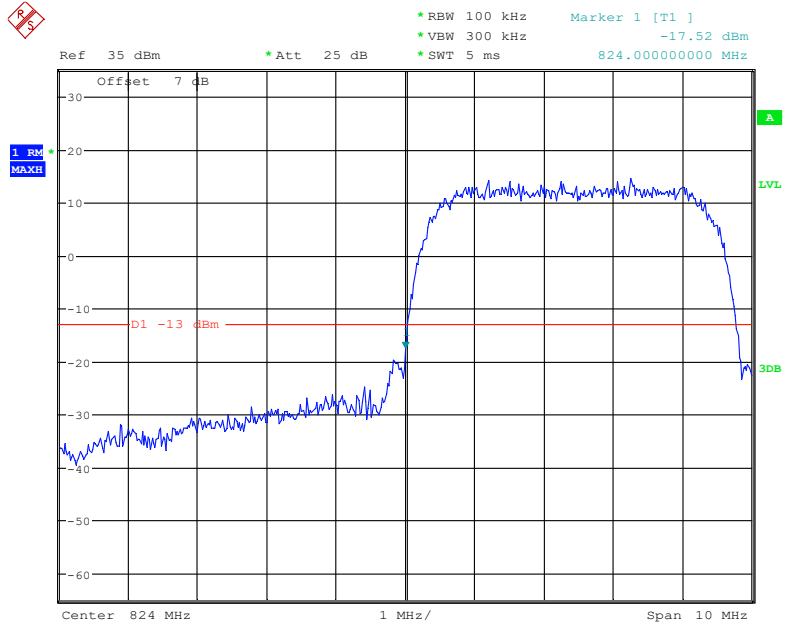
Date: 22.DEC.2021 18:52:09

Cellular Band, Right Band Edge for HSDPA (16QAM) Mode



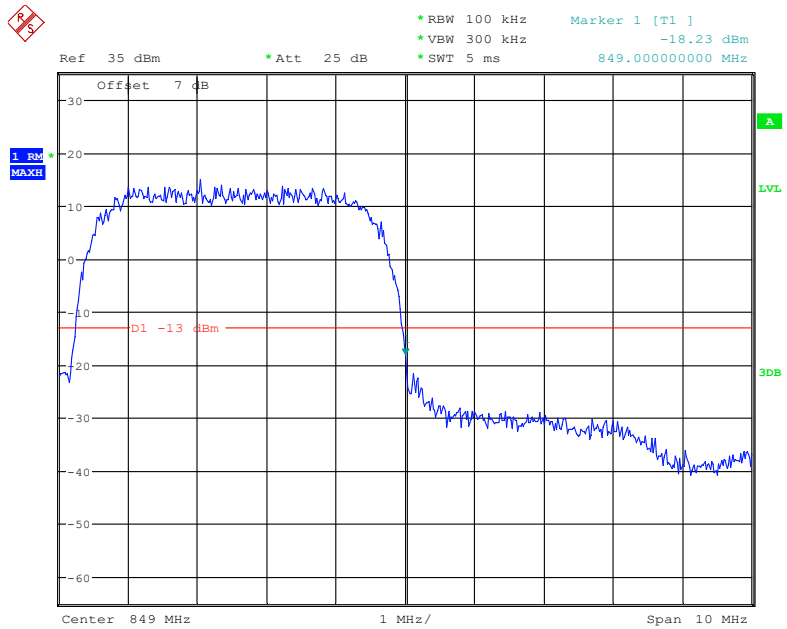
Date: 22.DEC.2021 18:51:39

Cellular Band, Left Band Edge for HSUPA (BPSK) Mode



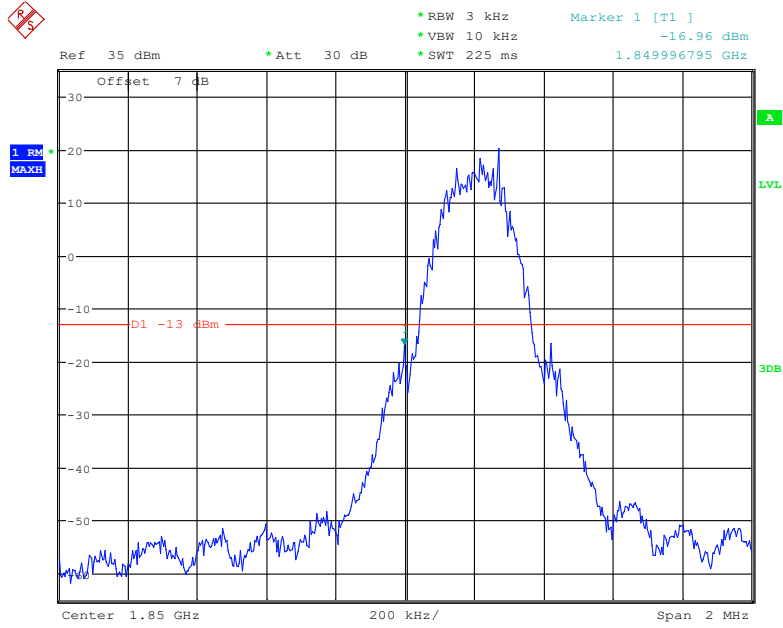
Date: 22.DEC.2021 18:56:05

Cellular Band, Right Band Edge for HSUPA (BPSK) Mode



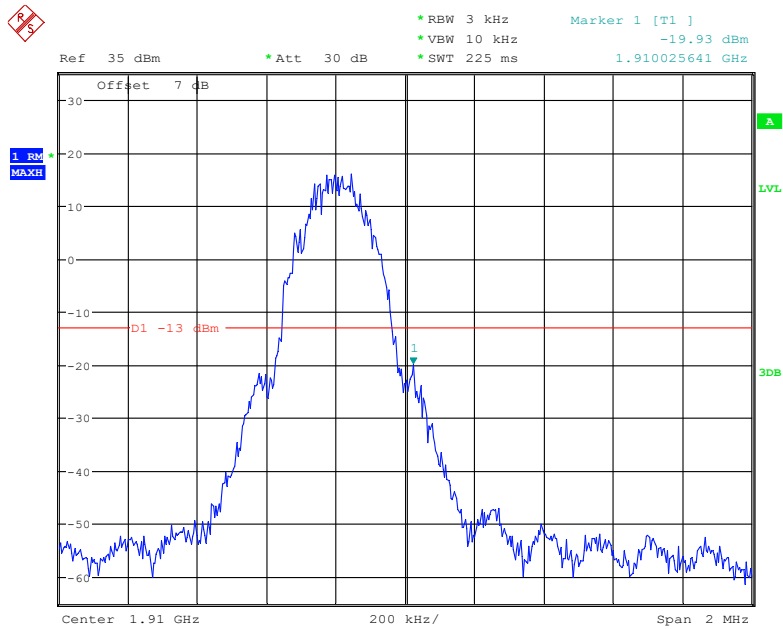
Date: 22.DEC.2021 18:56:30

PCS Band, Left Band Edge for GSM (GMSK) Mode



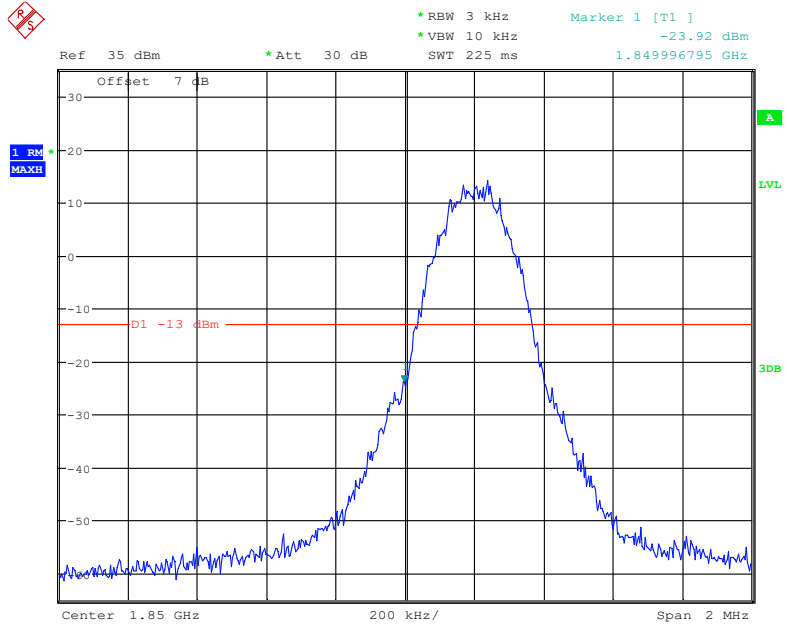
Date: 22.DEC.2021 16:58:26

PCS Band, Right Band Edge for GSM (GMSK) Mode



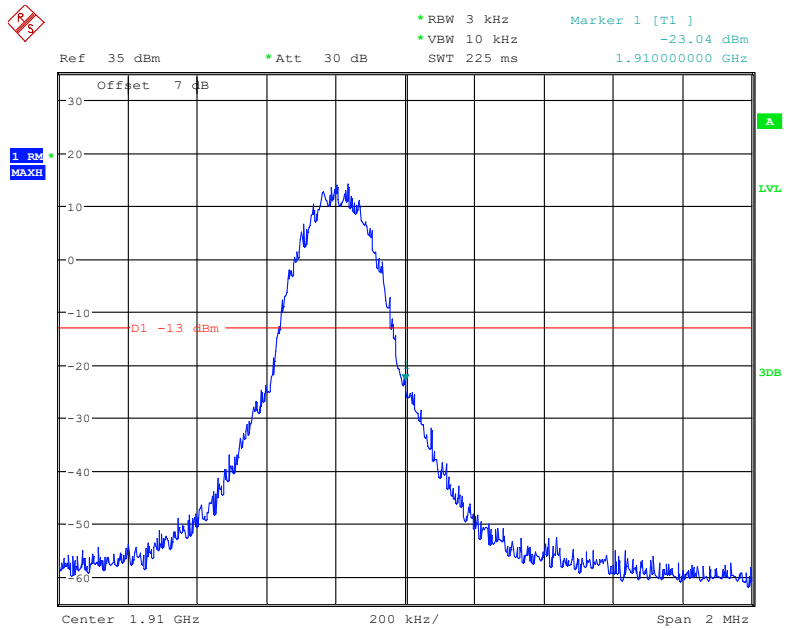
Date: 22.DEC.2021 16:59:11

PCS Band, Left Band Edge for EGPRS (8PSK) Mode



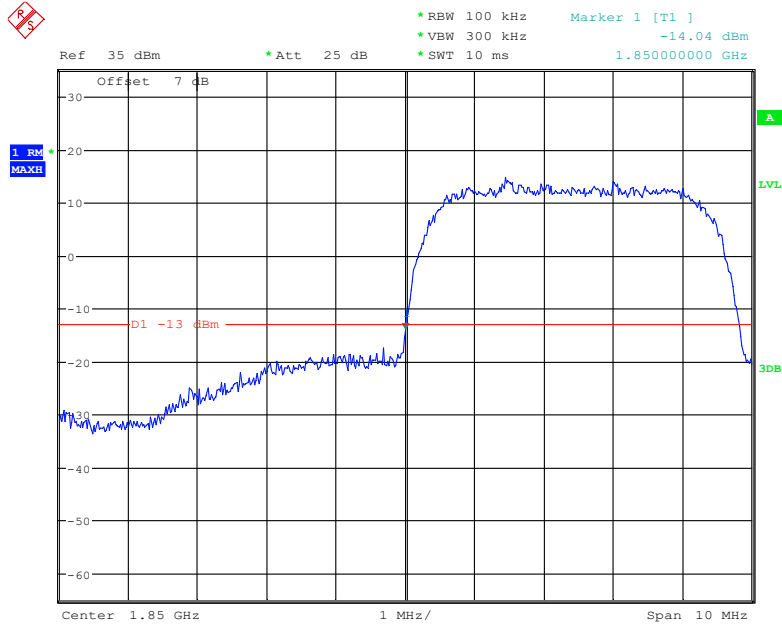
Date: 11.JAN.2022 17:32:47

PCS Band, Right Band Edge for EGPRS (8PSK) Mode



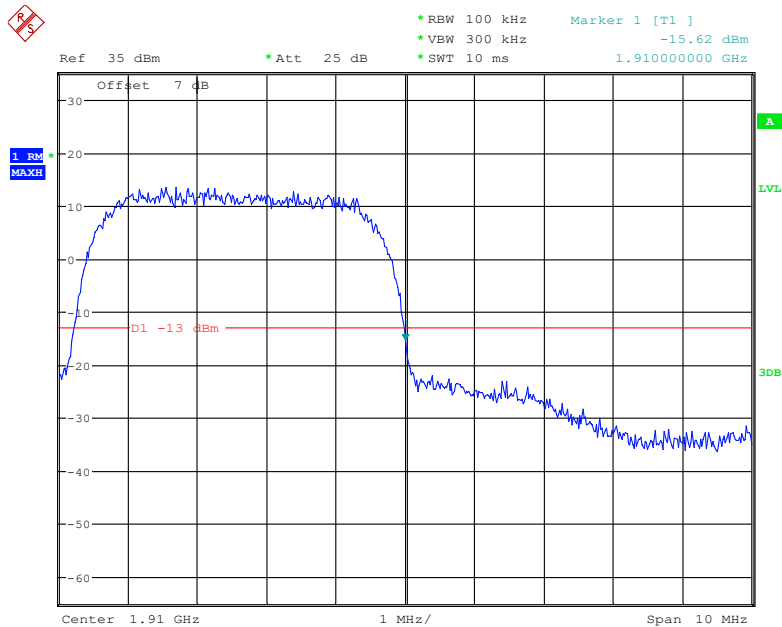
Date: 27.JAN.2022 09:40:54

PCS Band, Left Band Edge for RMC (BPSK) Mode



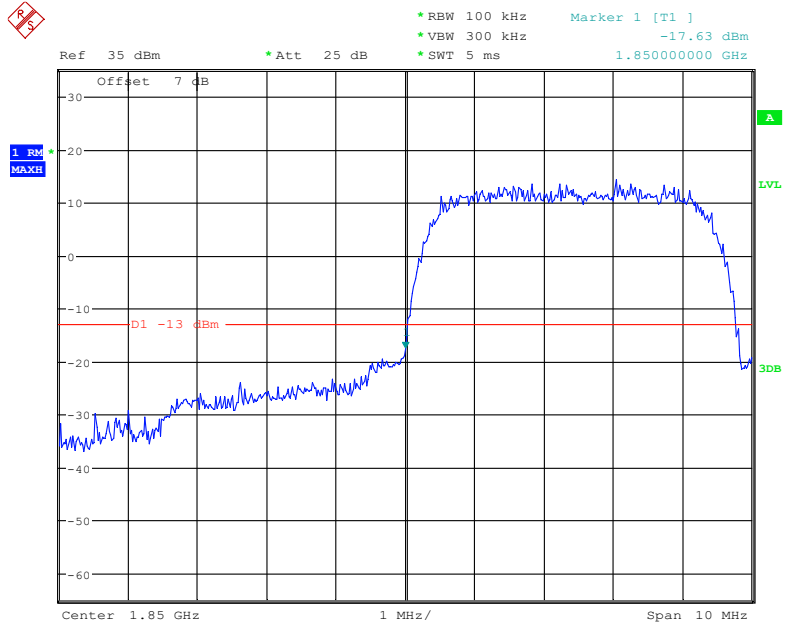
Date: 22.DEC.2021 18:27:49

PCS Band, Right Band Edge for RMC (BPSK) Mode



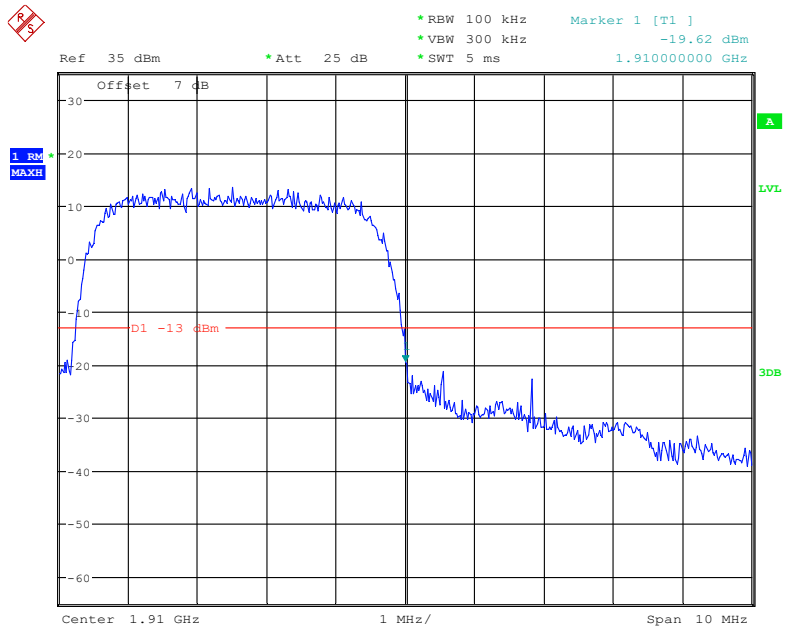
Date: 22.DEC.2021 18:29:26

PCS Band, Left Band Edge for HSDPA (16QAM) Mode



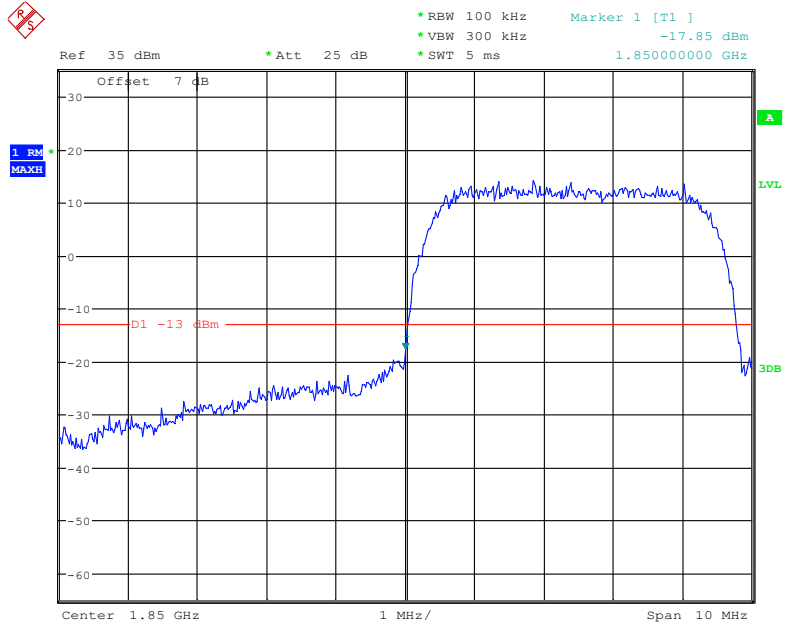
Date: 22.DEC.2021 18:52:40

PCS Band, Right Band Edge for HSDPA (16QAM) Mode



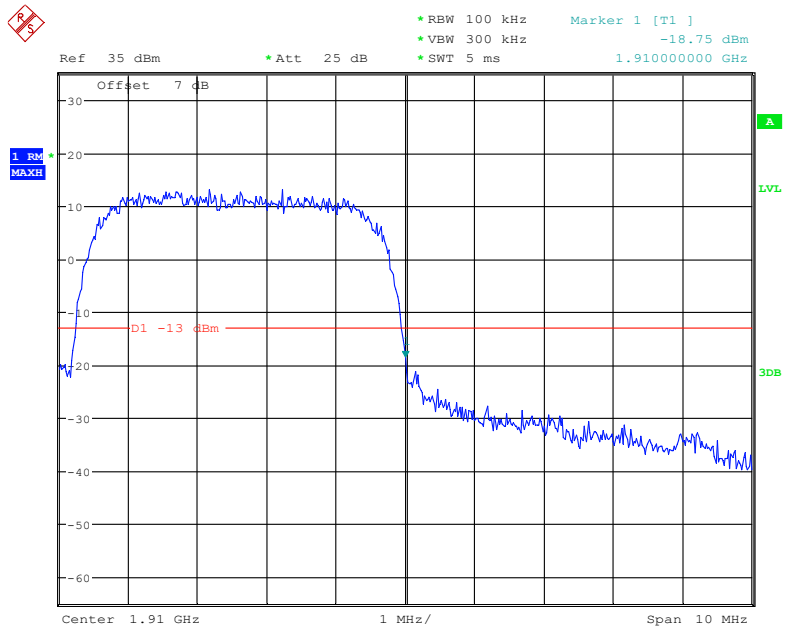
Date: 22.DEC.2021 18:53:06

PCS Band, Left Band Edge for HSUPA (BPSK) Mode



Date: 22.DEC.2021 18:55:43

PCS Band, Right Band Edge for HSUPA (BPSK) Mode



Date: 22.DEC.2021 18:54:39

The test plots of LTE bands please refer to the Appendix C.

FCC § 2.1055; § 22.355; § 24.235; §27.54 - FREQUENCY STABILITY

Applicable Standard

FCC § 2.1055, §22.355, §24.235 & §27.54.

According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile > 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

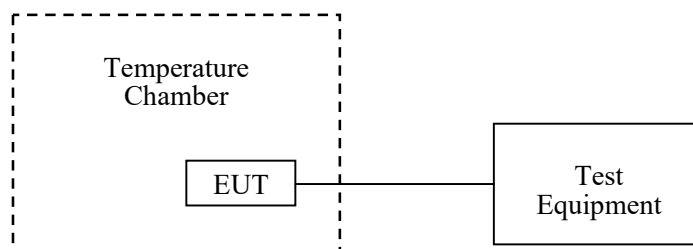
According to §24.235 & §27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external AC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The AC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



Test Data**Environmental Conditions**

Temperature:	27.2 °C
Relative Humidity:	56.8 %
ATM Pressure:	101.0 kPa

The testing was performed by Gala Liu from 2021-12-22 to 2022-01-12.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables.

Cellular Band (Part 22H)**GSM Mode**

Middle Channel, $f_0=836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	7	0.0084	2.5
-20		8	0.0096	2.5
-10		4	0.0048	2.5
0		6	0.0072	2.5
10		3	0.0036	2.5
20		5	0.0060	2.5
30		6	0.0072	2.5
40		4	0.0048	2.5
50		8	0.0096	2.5
20		L.V.	2	0.0024
	H.V.	3	0.0036	2.5

EGPRS Mode

Middle Channel, $f_0=836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	8	0.0096	2.5
-20		6	0.0072	2.5
-10		3	0.0036	2.5
0		4	0.0048	2.5
10		6	0.0072	2.5
20		2	0.0024	2.5
30		7	0.0084	2.5
40		3	0.0036	2.5
50		2	0.0024	2.5
20	L.V.	4	0.0048	2.5
	H.V.	3	0.0036	2.5

WCDMA Mode

Middle Channel, $f_0=836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	-8.97	-0.0107	2.5
-20		-11.26	-0.0135	2.5
-10		-10.12	-0.0121	2.5
0		-9.36	-0.0112	2.5
10		-9.17	-0.0110	2.5
20		-0.49	-0.0006	2.5
30		-10.11	-0.0121	2.5
40		-10.35	-0.0124	2.5
50		-9.76	-0.0117	2.5
20	L.V.	-9.82	-0.0117	2.5
	H.V.	-9.95	-0.0119	2.5

PCS Band (Part 24E)**GSM Mode**

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	N.V.	3	0.0016	pass
-20		4	0.0021	pass
-10		6	0.0032	pass
0		7	0.0037	pass
10		2	0.0011	pass
20		-4	-0.0021	pass
30		3	0.0016	pass
40		4	0.0021	pass
50		5	0.0027	pass
20		L.V.	6	0.0032
	H.V.	3	0.0016	pass

EGPRS Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	N.V.	4	0.0021	pass
-20		6	0.0032	pass
-10		8	0.0043	pass
0		10	0.0053	pass
10		4	0.0021	pass
20		-7	-0.0037	pass
30		3	0.0016	pass
40		5	0.0027	pass
50		7	0.0037	pass
20		L.V.	3	0.0016
	H.V.	4	0.0021	pass

WCDMA Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	N.V.	6.22	0.0033	pass
-20		5.18	0.0028	pass
-10		4.48	0.0024	pass
0		4.55	0.0024	pass
10		4.28	0.0023	pass
20		2.26	0.0012	pass
30		3.22	0.0017	pass
40		5.27	0.0028	pass
50		4.33	0.0023	pass
20		L.V.	2.52	0.0013
	H.V.	2.69	0.0014	pass

LTE:
QPSK:
Band 2:

10.0 MHz Middle Channel, $f_0=1880\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	NV	1.44	0.0008	pass
-20		-9.97	-0.0053	pass
-10		-6.13	-0.0033	pass
0		6.17	0.0033	pass
10		7.92	0.0042	pass
20		6.46	0.0034	pass
30		-6.52	-0.0035	pass
40		7.18	0.0038	pass
50		-9.69	-0.0052	pass
20		LV	-8.17	-0.0043
	HV	-7.05	-0.0038	pass

Band 5:

10.0 MHz Middle Channel, $f_0=836.5\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	-9.22	-0.0110	2.5
-20		9.11	0.0109	2.5
-10		8.51	0.0102	2.5
0		-7.15	-0.0085	2.5
10		-5.29	-0.0063	2.5
20		7.24	0.0087	2.5
30		-5.81	-0.0069	2.5
40		5.59	0.0067	2.5
50		6.87	0.0082	2.5
20		L.V.	9.94	0.0119
	H.V.	9.99	0.0119	2.5

Band 12:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	NV	699.9634	715.8873	699	716
-20		699.9645	715.7727	699	716
-10		699.4524	715.7452	699	716
0		699.4425	715.7634	699	716
10		699.3237	715.5413	699	716
20		699.4424	715.5285	699	716
30		699.2288	715.6324	699	716
40		699.3345	715.6316	699	716
50		699.4244	715.5436	699	716
20		LV	699.3373	715.5674	699
	HV	699.3375	715.5672	699	716

Band 41

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	NV	2496.9752	2689.7773	2496	2690
-20		2496.8676	2689.7254	2496	2690
-10		2496.7564	2689.7536	2496	2690
0		2496.6424	2689.7754	2496	2690
10		2496.5325	2689.7712	2496	2690
20		2496.4224	2689.7325	2496	2690
30		2496.3157	2689.7773	2496	2690
40		2496.2166	2689.7156	2496	2690
50		2496.2932	2689.7522	2496	2690
20		LV	2496.8625	2689.7652	2496
	HV	2496.8526	2689.7674	2496	2690

16QAM:**Band 2:**

10.0 MHz Middle Channel, $f_0=1880\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	NV	-3.09	-0.0016	pass
-20		-6.68	-0.0036	pass
-10		9.77	0.0052	pass
0		-7.62	-0.0041	pass
10		-9.91	-0.0053	pass
20		-9.82	-0.0052	pass
30		-6.68	-0.0036	pass
40		-8.85	-0.0047	pass
50		5.67	0.0030	pass
20		LV	6.05	0.0032
	HV	7.52	0.0040	pass

Band 5:

10.0 MHz Middle Channel, $f_0=836.5\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	27.04	0.0323	2.5
-20		6.80	0.0081	2.5
-10		-9.52	-0.0114	2.5
0		-8.15	-0.0097	2.5
10		-8.88	-0.0106	2.5
20		-9.82	-0.0117	2.5
30		8.38	0.0100	2.5
40		6.75	0.0081	2.5
50		-5.89	-0.0070	2.5
20		L.V.	8.98	0.0107
	H.V.	-7.83	-0.0094	2.5

Band 12:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	NV	699.3126	715.7363	699	716
-20		699.3132	715.6224	699	716
-10		699.3317	715.5957	699	716
0		699.3119	715.6125	699	716
10		699.1725	715.3922	699	716
20		699.2913	715.3774	699	716
30		699.0781	715.4817	699	716
40		699.1834	715.4805	699	716
50		699.2735	715.3944	699	716
20		LV	699.1865	715.4163	699
	HV	699.1867	715.4172	699	716

Band 41

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	NV	2496.9456	2689.7535	2496	2690
-20		2496.8442	2689.7289	2496	2690
-10		2496.7372	2689.7383	2496	2690
0		2496.6266	2689.7317	2496	2690
10		2496.5138	2689.7455	2496	2690
20		2496.4175	2689.7789	2496	2690
30		2496.2988	2689.7725	2496	2690
40		2496.1882	2689.7546	2496	2690
50		2496.1829	2689.7475	2496	2690
20		LV	2496.1618	2689.7741	2496
	HV	2496.0572	2689.7373	2496	2690

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