



FCC PART 27
FCC PART 22H, PART 24E
FCC PART 90
TEST REPORT

For

Vanstone Electronic (Beijing) Co., Ltd.

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China 100195

FCC ID: OWL-A90

Report Type: Original Report	Product Type: Smart POS Terminal
Report Number: SZXX1210425-13732E-RF-00F	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Smart POS Terminal
Tested Model	A90
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 4: 1710-1755MHz(TX); 2110-2155MHz(RX) WCDMA Band 5: 824-849MHz(TX); 869-894MHz(RX) LTE Band 2: 1850-1910MHz(TX); 1930-1990MHz(RX) LTE Band 4: 1710-1755MHz(TX); 2110-2155MHz(RX) LTE Band 5/LTE Band 26(Part22H): 824-849MHz(TX); 869-894MHz(RX) LTE Band 7: 2500-2570MHz(TX); 2620-2690MHz(RX) LTE Band 12: 699-716MHz(TX); 729-746MHz(RX) LTE Band 13: 777-787MHz(TX); 746-756MHz(RX) LTE Band 25: 1850-1915MHz(TX); 1930-1995MHz(RX) LTE Band 26(Part 90S): 814-824MHz(TX); 859-869MHz(RX)
Modulation Technique	2G: GMSK, 8PSK 3G: BPSK, QPSK, 16QAM 4G: QPSK, 16QAM
Antenna Specification*	GSM850/WCDMA Band 5/LTE Band 5: 0.5dBi PCS1900/WCDMA Band 2/ LTE Band 2/ LTE Band 25: 0.8dBi WCDMA Band 4/LTE Band 4: 0.8dBi LTE Band 7: 0.8dBi Band 12/Band 13: 0.5dBi Band 26: 0.5dBi (provided by the applicant)
Voltage Range	DC 3.60V from battery or DC 5.0 from adapter
Date of Test	2021-05-14 to 2021-08-17
Sample number	SZXX1210425-13732E-RF-S_3U8 for RF conducted SZXX1210425-13732E-SA-S_3UB for CE&RE (Assigned by BAACL, Shenzhen)
Received date	2021-04-25
Sample/EUT Status	Good condition
Adapter information	Model: TPA-46050200UU Input: AC 100-240V ~ 50/60Hz, 0.3A Output: DC 5.0V, 2000mA

Objective

This test report is in accordance with Part 2-Subpart J, Part 22-Subpart H, Part 24-Subpart E, Subpart 27 and Subpart 90 of the Federal Communication Commissions 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
 Part 90 – Private Land Mobile Radio Services

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

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). 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 output power, conducted		±0.73dB
Unwanted Emission, conducted		±1.6dB
Emissions, Radiated	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
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 Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West), 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, 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.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

Test was performed as below table:

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 B4	4.2	1712.4	1732.6	1752.6
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 B4	1.4	1710.7	1732.5	1754.3
	3	1711.5	1732.5	1753.5
	5	1712.5	1732.5	1752.5
	10	1715	1732.5	1750
	15	1717.5	1732.5	1747.5
	20	1720	1732.5	1745
LTE B5/ LTE Band26(Part22H)	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
	15(B26 only)	831.5	836.5	841.5
LTE B7	5	2502.5	2535	2567.5
	10	2505	2535	2565
	15	2507.5	2535	2562.5
	20	2510	2535	2560
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	707.5	711
LTE B13	15	779.5	782	784.5
	20	/	782	/

Frequency Band	Bandwidth (MHz)	Test Frequency(MHz)		
		Low	Middle	High
LTE B25	1.4	1850.7	1882.5	1914.3
	3	1851.5	1882.5	1913.5
	5	1852.5	1882.5	1912.5
	10	1855	1882.5	1910
	15	1857.5	1882.5	1907.5
	20	1860	1882.5	1905
LTE B26(Part90S)	1.4	814.7	819	823.3
	3	815.5	819	822.5
	5	816.5	819	821.5
	10	/	819	/

Equipment Modifications

No modification was made to the EUT.

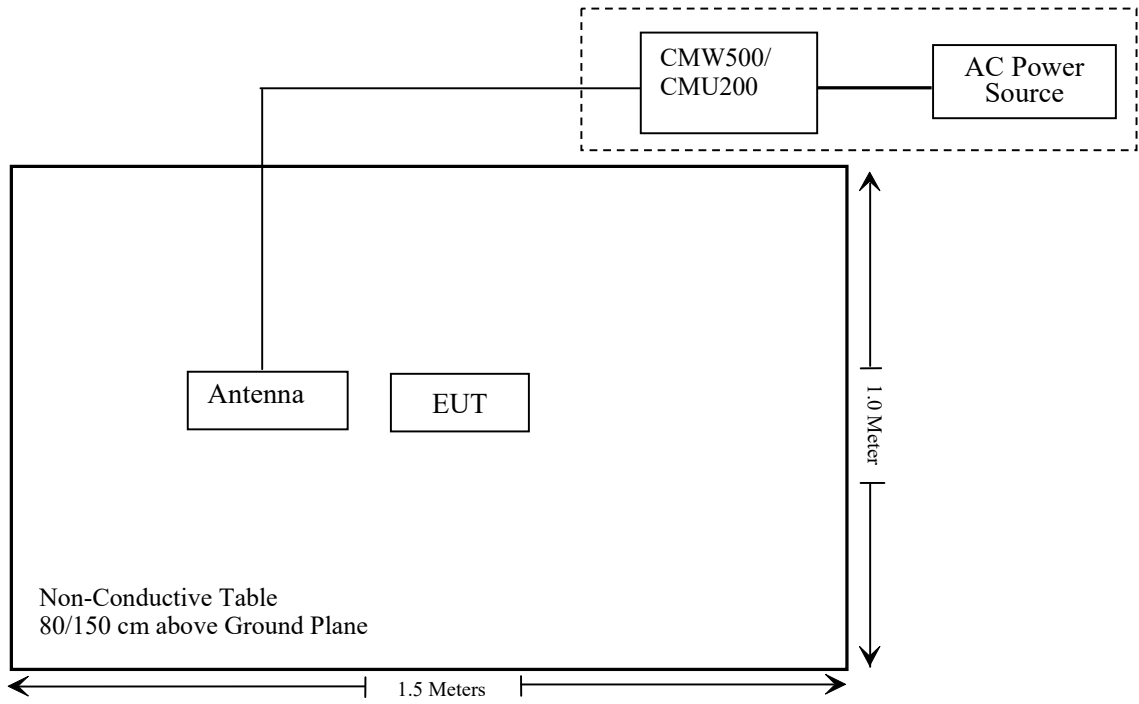
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	110605
Rohde & Schwarz	Wideband Radio Communication tester	CMW500	146520

Support Cable Description

Cable Description	Length (m)	From / Port	To
Unshielded Un-detachable AC cable	1.2	AC Power	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 (c) (d) (h); § 90.635	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; §90.691	Spurious Emissions at Antenna Terminal	Compliant
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53; §90.691	Field Strength of Spurious Radiation	Compliant
§ 22.917 (a); § 24.238 (a); §27.53(c)(h) (m); §90.691	Band Edge	Compliant
§ 2.1055; § 22.355; § 24.235; §27.54; § 90.213	Frequency stability	Compliant

Note: * Please refer to SAR report released by BACL, report number: SZXX1210425-13732E-SA.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
R&S	EMI Test Receiver	ESR3	102455	2020/08/04	2021/08/03
Sonoma instrument	Pre-amplifier	310 N	186238	2020/08/04	2021/08/03
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2020/12/22	2023/12/21
COM-POWER	Dipole Antenna	AD-100	721027	NCR	NCR
Unknown	Cable	Chamber Cable 1	F-03-EM236	2020/11/29	2021/11/28
Unknown	Cable	Chamber Cable 4	EC-007	2020/11/29	2021/11/28
Rohde & Schwarz	Spectrum Analyzer	FSV40-N	102259	2021/07/06	2022/07/05
COM-POWER	Pre-amplifier	PA-122	181919	2020/11/29	2021/11/28
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2020/11/28	2021/11/27
Sunol Sciences	Horn Antenna	3115	9107-3694	2021/01/15	2024/01/14
A.H.System	Horn Antenna	SAS-200/571	135	2021/07/14	2024/07/13
Insulted Wire Inc.	RF Cable	SPS-2503-3150	02222010	2020/11/29	2021/11/28
MICRO-TRONICS	Passband filter	HPM50111	F-19-EM006	2021/04/20	2022/04/20
Unknown	High Pass filter	1.3GHz	101120	2021/04/20	2022/04/20
Ducommun Technologies	Horn antenna	ARH-4223-02	1007726-02 1304	2020/12/06	2023/12/05
Ducommun Technologies	Horn antenna	ARH-4223-02	1007726-01 1304	2020/12/06	2023/12/05
Agilent	Signal Generator	N5183A	MY51040755	2020/12/29	2021/12/28

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2021/04/02	2022/04/01
Unknown	RF Cable	Unknown	2301 276	2020/11/29	2021/11/28
Weinschel	Power divider	1515	RH386	2021/04/20	2022/04/20
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	115500	2020/07/31	2021/07/30
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	115500	2021/07/06	2022/07/05
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh	2020/08/04	2021/08/03
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh	2021/07/06	2022/07/05

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Shenzhen) 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

Compliance, please refer to the SAR report: SZXX1210425-13732E-SA.

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E & 27 & 90 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(b) (c) (d) (h); §90.635 - 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(b), Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP..

According to §27.50(c), 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(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1780MHz.

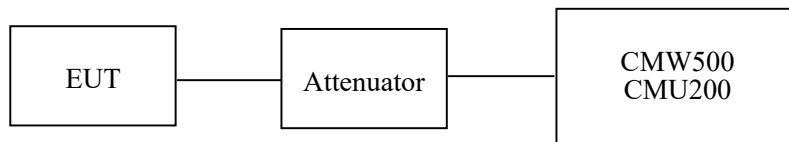
According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2500-2570MHz & 2496-2690MHz.

According to §90.635(b), The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

Test Procedure

Conducted method:

The RF output of the transmitter was connected to the CMW500/CMU200 through sufficient attenuation.



Test Data

Environmental Conditions

Temperature:	26.2~28.6 °C
Relative Humidity:	52~60 %
ATM Pressure:	100.9~101.2 kPa

The testing was performed by Pedro Yun from 2021-05-14 to 2021-08-08.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables and plots.

Cellular 850

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	25.85	25.75	22.60	21.31	23.70	23.60	20.45	19.16	38.45
	190	836.6	25.70	25.54	22.40	21.15	23.55	23.39	20.25	19.00	38.45
	251	848.8	25.78	25.62	22.55	21.22	23.63	23.47	20.40	19.07	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	22.93	21.92	21.89	21.72	20.78	19.77	19.74	19.57	38.45
	190	836.6	22.67	21.46	21.32	21.27	20.52	19.31	19.17	19.12	38.45
	251	848.8	22.71	21.50	21.52	21.47	20.56	19.35	19.37	19.32	38.45

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) -Cable Loss(dB)
 For GSM850 Antenna Gain = 0.5dBi = -1.65dBd (0dBd=2.15dBi)
 Cable Loss=0.5dB*(provided by the applicant)

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 5)	RMC12.2k		21.29	21.43	21.73	19.14	19.28	19.58
	HSDPA	1	20.36	20.93	21.47	18.21	18.78	19.32
		2	20.46	20.53	20.93	18.31	18.38	18.78
		3	20.22	20.48	20.74	18.07	18.33	18.59
		4	20.08	20.36	20.85	17.93	18.21	18.70
	HSUPA	1	19.79	20.37	20.95	17.64	18.22	18.80
		2	19.71	20.62	20.92	17.56	18.47	18.77
		3	19.69	20.31	20.87	17.54	18.16	18.72
		4	19.73	20.54	20.76	17.58	18.39	18.61
		5	19.66	20.36	20.89	17.51	18.21	18.74
	HSPA+	1	19.52	20.14	20.48	17.37	17.99	18.33

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) -Cable Loss(dB)
 For WCDMA Band5: Antenna Gain = 0.5dBi = -1.65dBd (0dBd=2.15dBi)
 Cable Loss=0.5dB*(provided by the applicant)
 Limit: ERP ≤ 38.45dBm

PCS 1900

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	29.55	27.06	25.67	24.12	29.55	27.06	25.67	24.12	33
	661	1880.0	29.05	27.95	25.32	23.79	29.05	27.95	25.32	23.79	33
	810	1909.8	28.68	27.45	24.92	23.59	28.68	27.45	24.92	23.59	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	24.41	23.38	21.82	20.56	24.41	23.38	21.82	20.56	33
	661	1880.0	24.02	23.06	21.47	20.19	24.02	23.06	21.47	20.19	33
	810	1909.8	23.75	22.81	21.16	19.93	23.75	22.81	21.16	19.93	33

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) -Cable Loss(dB)
 For PCS 1900&B2: Antenna Gain = 0.8dBi
 Cable Loss=0.8dB*(provided by the applicant)

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 2)	RMC12.2k		22.94	22.88	22.83	22.94	22.88	22.83
	HSDPA	1	22.26	22.15	21.97	22.26	22.15	21.97
		2	22.31	22.18	21.89	22.31	22.18	21.89
		3	22.38	22.29	22.06	22.38	22.29	22.06
		4	22.33	22.25	22.10	22.33	22.25	22.10
	HSUPA	1	21.98	21.71	21.65	21.98	21.71	21.65
		2	22.05	21.78	21.69	22.05	21.78	21.69
		3	22.08	21.82	21.75	22.08	21.82	21.75
		4	22.10	21.89	21.78	22.10	21.89	21.78
		5	22.13	21.93	21.86	22.13	21.93	21.86
	HSPA+	1	22.15	21.97	21.93	22.15	21.97	21.93

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) -Cable Loss(dB)
 For PCS 1900&B2: Antenna Gain = 0.8dBi
 Cable Loss=0.8dB*(provided by the applicant)
 Limit: EIRP ≤ 33dBm

AWS Band4

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 4)	RMC12.2k		22.57	22.36	22.41	22.57	22.36	22.41
	HSDPA	1	21.78	21.69	21.72	21.78	21.69	21.72
		2	21.85	21.77	21.75	21.85	21.77	21.75
		3	21.91	21.82	21.78	21.91	21.82	21.78
		4	21.97	21.86	21.83	21.97	21.86	21.83
	HSUPA	1	21.35	21.25	21.33	21.35	21.25	21.33
		2	21.40	21.32	21.40	21.40	21.32	21.40
		3	21.48	21.39	21.43	21.48	21.39	21.43
		4	21.55	21.41	21.51	21.55	21.41	21.51
		5	21.63	21.45	21.58	21.63	21.45	21.58
	HSPA+	1	21.70	21.48	21.63	21.70	21.48	21.63

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) -Cable Loss(dB)
 For Band4: Antenna Gain = 0.8dBi
 Cable Loss=0.8dB*(provided by the applicant)
 Limit: EIRP ≤ 30dBm

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit (dB)
GPRS	Low	3.18	13
	Middle	3.43	13
	High	3.45	13
EGPRS	Low	3.26	13
	Middle	3.32	13
	High	3.36	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.44	13
	Middle	3.32	13
	High	3.48	13
HSDPA (16QAM)	Low	3.43	13
	Middle	3.16	13
	High	3.37	13
HSUPA (BPSK)	Low	3.14	13
	Middle	3.15	13
	High	3.33	13
HSUPA+	Low	3.43	13
	Middle	3.31	13
	High	3.18	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GPRS	Low	3.19	13
	Middle	3.15	13
	High	3.47	13
EGPRS	Low	3.21	13
	Middle	3.25	13
	High	3.38	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.54	13
	Middle	3.43	13
	High	3.36	13
HSDPA (16QAM)	Low	3.50	13
	Middle	3.33	13
	High	3.43	13
HSUPA (BPSK)	Low	3.31	13
	Middle	3.63	13
	High	3.47	13
HSUPA+	Low	3.14	13
	Middle	3.31	13
	High	3.24	13

AWS Band

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.15	13
	Middle	3.27	13
	High	3.68	13
HSDPA (16QAM)	Low	3.24	13
	Middle	3.12	13
	High	3.57	13
HSUPA (BPSK)	Low	3.23	13
	Middle	3.44	13
	High	3.42	13
HSUPA+	Low	3.30	13
	Middle	3.49	13
	High	3.36	13

LTE Band 2

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	22.10	22.24	22.41	22.10	22.24	22.41
		RB1#3	22.19	22.40	22.55	22.19	22.40	22.55
		RB1#5	22.14	22.25	22.45	22.14	22.25	22.45
		RB3#0	22.25	22.37	22.53	22.25	22.37	22.53
		RB3#3	22.30	22.34	22.38	22.30	22.34	22.38
		RB6#0	21.35	21.31	21.42	21.35	21.31	21.42
	16QAM	RB1#0	21.57	21.04	21.51	21.57	21.04	21.51
		RB1#3	22.03	21.41	21.77	22.03	21.41	21.77
		RB1#5	22.07	21.39	21.51	22.07	21.39	21.51
		RB3#0	21.62	21.15	21.42	21.62	21.15	21.42
		RB3#3	21.93	21.10	21.41	21.93	21.10	21.41
		RB6#0	20.40	20.36	20.43	20.40	20.36	20.43
3.0	QPSK	RB1#0	22.42	22.44	22.23	22.42	22.44	22.23
		RB1#8	22.16	22.32	22.13	22.16	22.32	22.13
		RB1#14	22.11	22.44	22.31	22.11	22.44	22.31
		RB6#0	21.30	21.38	21.47	21.30	21.38	21.47
		RB6#9	21.27	21.25	21.24	21.27	21.25	21.24
		RB15#0	21.31	21.30	21.45	21.31	21.30	21.45
	16QAM	RB1#0	21.46	21.65	21.45	21.46	21.65	21.45
		RB1#8	21.37	21.22	20.75	21.37	21.22	20.75
		RB1#14	21.40	21.62	20.80	21.40	21.62	20.80
		RB6#0	20.24	20.48	20.32	20.24	20.48	20.32
		RB6#9	20.13	20.46	20.30	20.13	20.46	20.30
		RB15#0	20.09	20.36	20.21	20.09	20.36	20.21

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	22.17	22.46	22.32	22.17	22.46	22.32
		RB1#13	22.16	22.37	22.09	22.16	22.37	22.09
		RB1#24	22.14	22.58	22.04	22.14	22.58	22.04
		RB15#0	21.27	21.31	21.40	21.27	21.31	21.40
		RB15#10	21.23	21.33	21.32	21.23	21.33	21.32
		RB25#0	21.24	21.30	21.42	21.24	21.30	21.42
	16QAM	RB1#0	20.52	21.51	21.05	20.52	21.51	21.05
		RB1#13	20.21	20.96	21.05	20.21	20.96	21.05
		RB1#24	20.58	21.43	20.92	20.58	21.43	20.92
		RB15#0	20.28	20.22	20.36	20.28	20.22	20.36
		RB15#10	20.15	20.19	20.43	20.15	20.19	20.43
		RB25#0	20.28	20.11	20.42	20.28	20.11	20.42
10.0	QPSK	RB1#0	22.53	22.38	22.49	22.53	22.38	22.49
		RB1#25	22.37	22.30	22.51	22.37	22.30	22.51
		RB1#49	22.29	22.29	22.37	22.29	22.29	22.37
		RB25#0	21.39	21.40	21.48	21.39	21.40	21.48
		RB25#25	21.27	21.35	21.45	21.27	21.35	21.45
		RB50#0	21.32	21.43	21.49	21.32	21.43	21.49
	16QAM	RB1#0	21.43	22.06	21.65	21.43	22.06	21.65
		RB1#25	21.38	21.62	21.50	21.38	21.62	21.50
		RB1#49	21.35	21.61	20.58	21.35	21.61	20.58
		RB25#0	20.32	20.51	20.63	20.32	20.51	20.63
		RB25#25	20.39	20.34	20.82	20.39	20.34	20.82
		RB50#0	20.31	20.33	20.38	20.31	20.33	20.38

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	22.38	22.40	22.48	22.38	22.40	22.48
		RB1#38	22.18	22.41	22.39	22.18	22.41	22.39
		RB1#74	22.37	22.23	22.29	22.37	22.23	22.29
		RB36#0	21.29	21.40	21.52	21.29	21.40	21.52
		RB36#39	21.26	21.24	21.38	21.26	21.24	21.38
		RB75#0	21.37	21.28	21.31	21.37	21.28	21.31
	16QAM	RB1#0	21.40	22.09	21.71	21.40	22.09	21.71
		RB1#38	21.09	21.33	21.51	21.09	21.33	21.51
		RB1#74	21.65	21.64	21.51	21.65	21.64	21.51
		RB36#0	20.29	20.38	20.60	20.29	20.38	20.60
		RB36#39	20.35	20.08	20.37	20.35	20.08	20.37
		RB75#0	20.47	20.29	20.39	20.47	20.29	20.39
20.0	QPSK	RB1#0	22.72	22.47	22.63	22.72	22.47	22.63
		RB1#50	22.43	22.64	22.47	22.43	22.64	22.47
		RB1#99	22.67	22.60	22.25	22.67	22.60	22.25
		RB50#0	21.25	21.29	21.38	21.25	21.29	21.38
		RB50#50	21.38	21.29	21.32	21.38	21.29	21.32
		RB100#0	21.40	21.28	21.34	21.40	21.28	21.34
	16QAM	RB1#0	21.63	21.70	21.88	21.63	21.70	21.88
		RB1#50	20.96	21.51	22.53	20.96	21.51	22.53
		RB1#99	20.91	21.48	21.90	20.91	21.48	21.90
		RB50#0	20.33	20.40	20.33	20.33	20.40	20.33
		RB50#50	20.35	20.26	20.43	20.35	20.26	20.43
		RB100#0	20.30	20.39	20.53	20.30	20.39	20.53

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

For Band2: Antenna Gain = 0.8dBi(provided by the applicant)

Cable Loss=0.8dB*(provided by the applicant)

Limit: EIRP ≤ 33dBm

LTE Band 4

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	23.14	23.04	22.89	23.14	23.04	22.89
		RB1#3	23.11	23.12	23.05	23.11	23.12	23.05
		RB1#5	23.16	23.03	22.85	23.16	23.03	22.85
		RB3#0	23.23	23.01	22.85	23.23	23.01	22.85
		RB3#3	23.07	23.05	22.91	23.07	23.05	22.91
		RB6#0	22.06	22.02	21.92	22.06	22.02	21.92
	16QAM	RB1#0	22.71	21.98	21.85	22.71	21.98	21.85
		RB1#3	22.79	22.04	21.82	22.79	22.04	21.82
		RB1#5	22.65	22.54	21.54	22.65	22.54	21.54
		RB3#0	21.89	22.54	21.72	21.89	22.54	21.72
		RB3#3	21.89	22.19	21.83	21.89	22.19	21.83
		RB6#0	21.35	21.24	20.91	21.35	21.24	20.91
3.0	QPSK	RB1#0	23.08	23.24	22.87	23.08	23.24	22.87
		RB1#8	23.10	22.97	22.93	23.10	22.97	22.93
		RB1#14	23.06	23.19	23.04	23.06	23.19	23.04
		RB6#0	22.11	22.00	21.92	22.11	22.00	21.92
		RB6#9	22.03	21.94	22.11	22.03	21.94	22.11
		RB15#0	22.20	22.01	21.95	22.20	22.01	21.95
	16QAM	RB1#0	22.16	22.38	21.89	22.16	22.38	21.89
		RB1#8	22.15	22.38	21.79	22.15	22.38	21.79
		RB1#14	22.18	22.64	21.93	22.18	22.64	21.93
		RB6#0	21.43	21.28	21.02	21.43	21.28	21.02
		RB6#9	21.08	21.36	21.20	21.08	21.36	21.20
		RB15#0	21.23	21.32	21.14	21.23	21.32	21.14

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	23.00	23.17	22.88	23.00	23.17	22.88
		RB1#13	23.07	23.04	22.81	23.07	23.04	22.81
		RB1#24	22.82	23.26	22.93	22.82	23.26	22.93
		RB15#0	22.12	22.03	21.92	22.12	22.03	21.92
		RB15#10	22.09	22.00	22.00	22.09	22.00	22.00
		RB25#0	22.10	22.09	21.97	22.10	22.09	21.97
	16QAM	RB1#0	21.38	22.16	21.47	21.38	22.16	21.47
		RB1#13	21.10	21.61	21.41	21.10	21.61	21.41
		RB1#24	21.33	22.07	21.95	21.33	22.07	21.95
		RB15#0	21.03	20.91	20.89	21.03	20.91	20.89
		RB15#10	21.19	21.03	21.06	21.19	21.03	21.06
		RB25#0	21.34	21.10	21.02	21.34	21.10	21.02
10.0	QPSK	RB1#0	23.35	23.20	23.08	23.35	23.20	23.08
		RB1#25	23.10	23.26	23.00	23.10	23.26	23.00
		RB1#49	23.01	23.08	22.98	23.01	23.08	22.98
		RB25#0	22.13	22.06	22.04	22.13	22.06	22.04
		RB25#25	21.99	22.12	21.97	21.99	22.12	21.97
		RB50#0	22.20	22.00	22.07	22.20	22.00	22.07
	16QAM	RB1#0	22.43	22.16	22.07	22.43	22.16	22.07
		RB1#25	22.34	22.16	21.45	22.34	22.16	21.45
		RB1#49	21.84	22.43	21.57	21.84	22.43	21.57
		RB25#0	21.24	21.15	21.18	21.24	21.15	21.18
		RB25#25	21.10	21.11	21.10	21.10	21.11	21.10
		RB50#0	21.19	21.06	21.06	21.19	21.06	21.06

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	23.20	23.17	23.04	23.20	23.17	23.04
		RB1#38	23.13	23.09	23.02	23.13	23.09	23.02
		RB1#74	23.01	23.03	22.93	23.01	23.03	22.93
		RB36#0	22.07	21.97	22.06	22.07	21.97	22.06
		RB36#39	21.94	21.95	21.81	21.94	21.95	21.81
		RB75#0	22.01	21.88	22.02	22.01	21.88	22.02
	16QAM	RB1#0	22.14	22.35	22.38	22.14	22.35	22.38
		RB1#38	21.85	22.10	22.08	21.85	22.10	22.08
		RB1#74	22.21	22.81	22.20	22.21	22.81	22.20
		RB36#0	21.15	21.03	21.02	21.15	21.03	21.02
		RB36#39	21.01	21.10	20.85	21.01	21.10	20.85
		RB75#0	21.09	20.97	20.99	21.09	20.97	20.99
20.0	QPSK	RB1#0	23.59	23.27	23.12	23.59	23.27	23.12
		RB1#50	23.22	23.17	23.38	23.22	23.17	23.38
		RB1#99	23.48	23.14	23.36	23.48	23.14	23.36
		RB50#0	22.36	22.23	22.19	22.36	22.23	22.19
		RB50#50	22.18	22.25	22.07	22.18	22.25	22.07
		RB100#0	22.21	22.17	22.07	22.21	22.17	22.07
	16QAM	RB1#0	22.86	22.47	21.85	22.86	22.47	21.85
		RB1#50	21.69	22.56	21.65	21.69	22.56	21.65
		RB1#99	22.59	22.72	21.66	22.59	22.72	21.66
		RB50#0	21.33	21.26	21.16	21.33	21.26	21.16
		RB50#50	21.28	21.22	21.26	21.28	21.22	21.26
		RB100#0	21.24	21.24	21.07	21.24	21.24	21.07

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

For Band4: Antenna Gain =0.8dBi (provided by the applicant)

Cable Loss=0.8dB*(provided by the applicant)

Limit: EIRP ≤ 30dBm

LTE Band5/Band 26(Part 22H)

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	24.32	24.14	24.22	22.17	21.99	22.07
		RB1#3	24.44	24.38	24.22	22.29	22.23	22.07
		RB1#5	24.41	24.15	24.16	22.26	22.00	22.01
		RB3#0	24.30	24.27	24.33	22.15	22.12	22.18
		RB3#3	24.26	24.24	24.29	22.11	22.09	22.14
		RB6#0	23.37	23.25	23.38	21.22	21.10	21.23
	16QAM	RB1#0	23.53	23.18	22.82	21.38	21.03	20.67
		RB1#3	23.61	23.40	23.02	21.46	21.25	20.87
		RB1#5	23.82	23.45	22.81	21.67	21.30	20.66
		RB3#0	23.18	23.44	23.16	21.03	21.29	21.01
		RB3#3	23.19	23.23	23.02	21.04	21.08	20.87
		RB6#0	22.34	22.64	22.24	20.19	20.49	20.09
3.0	QPSK	RB1#0	24.23	24.28	24.16	22.08	22.13	22.01
		RB1#8	24.18	24.19	24.08	22.03	22.04	21.93
		RB1#14	24.36	24.21	24.14	22.21	22.06	21.99
		RB6#0	23.41	23.33	23.22	21.26	21.18	21.07
		RB6#9	23.49	23.29	23.26	21.34	21.14	21.11
		RB15#0	23.35	23.33	23.36	21.20	21.18	21.21
	16QAM	RB1#0	23.63	23.67	23.07	21.48	21.52	20.92
		RB1#8	23.33	23.35	22.79	21.18	21.20	20.64
		RB1#14	23.45	23.26	22.90	21.30	21.11	20.75
		RB6#0	22.39	22.43	22.27	20.24	20.28	20.12
		RB6#9	22.55	22.50	22.22	20.40	20.35	20.07
		RB15#0	22.41	22.46	22.65	20.26	20.31	20.50

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	24.07	24.15	24.18	21.92	22.00	22.03
		RB1#13	24.31	24.48	24.06	22.16	22.33	21.91
		RB1#24	24.41	24.39	24.20	22.26	22.24	22.05
		RB15#0	23.52	23.26	23.29	21.37	21.11	21.14
		RB15#10	23.45	23.34	23.38	21.30	21.19	21.23
		RB25#0	23.39	23.34	23.21	21.24	21.19	21.06
	16QAM	RB1#0	22.54	23.36	22.72	20.39	21.21	20.57
		RB1#13	22.71	23.20	22.92	20.56	21.05	20.77
		RB1#24	22.65	23.38	22.93	20.50	21.23	20.78
		RB15#0	22.26	22.26	22.21	20.11	20.11	20.06
		RB15#10	22.42	22.25	22.38	20.27	20.10	20.23
		RB25#0	22.35	22.32	22.34	20.20	20.17	20.19
10.0	QPSK	RB1#0	24.43	24.47	24.20	22.28	22.32	22.05
		RB1#25	24.30	24.17	24.23	22.15	22.02	22.08
		RB1#49	24.18	24.10	24.26	22.03	21.95	22.11
		RB25#0	23.41	23.26	23.35	21.26	21.11	21.20
		RB25#25	23.27	23.32	23.26	21.12	21.17	21.11
		RB50#0	23.44	23.26	23.30	21.29	21.11	21.15
	16QAM	RB1#0	23.40	23.48	23.29	21.25	21.33	21.14
		RB1#25	23.45	23.39	23.08	21.30	21.24	20.93
		RB1#49	23.30	23.34	22.82	21.15	21.19	20.67
		RB25#0	22.45	22.38	22.34	20.30	20.23	20.19
		RB25#25	22.39	22.23	22.48	20.24	20.08	20.33
		RB50#0	22.35	22.36	22.23	20.20	20.21	20.08

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	22.86	22.97	22.90	20.71	20.82	20.75
		RB1#38	22.92	23.00	22.89	20.77	20.85	20.74
		RB1#74	23.01	23.05	22.92	20.86	20.90	20.77
		RB36#0	21.87	21.92	21.96	19.72	19.77	19.81
		RB36#39	21.88	21.85	21.87	19.73	19.70	19.72
		RB75#0	21.88	21.96	21.88	19.73	19.81	19.73
	16QAM	RB1#0	21.92	22.26	22.15	19.77	20.11	20.00
		RB1#38	21.91	22.04	21.91	19.76	19.89	19.76
		RB1#74	22.13	22.60	22.06	19.98	20.45	19.91
		RB36#0	20.90	21.03	20.97	18.75	18.88	18.82
		RB36#39	20.89	20.88	20.88	18.74	18.73	18.73
		RB75#0	20.91	21.07	20.89	18.76	18.92	18.74

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)
 For Band5: Antenna Gain =0.5dBi = -1.65dBd (0dBd=2.15dBi)(provided by the applicant)
 Cable Loss=0.5dB*(provided by the applicant)
 Limit: ERP ≤ 38.45dBm

LTE Band 7

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	22.20	21.60	21.54	22.20	21.60	21.54
		RB1#13	22.16	21.72	21.21	22.16	21.72	21.21
		RB1#24	21.95	21.89	21.44	21.95	21.89	21.44
		RB15#0	21.36	20.78	20.37	21.36	20.78	20.37
		RB15#10	21.27	20.65	20.23	21.27	20.65	20.23
		RB25#0	21.24	20.71	20.38	21.24	20.71	20.38
	16QAM	RB1#0	20.30	20.73	20.44	20.30	20.73	20.44
		RB1#13	20.28	20.72	19.87	20.28	20.72	19.87
		RB1#24	20.52	20.76	19.73	20.52	20.76	19.73
		RB15#0	20.19	19.63	19.44	20.19	19.63	19.44
		RB15#10	20.16	19.64	19.28	20.16	19.64	19.28
		RB25#0	20.48	19.66	19.27	20.48	19.66	19.27
10.0	QPSK	RB1#0	22.48	21.88	21.47	22.48	21.88	21.47
		RB1#25	22.09	21.63	21.62	22.09	21.63	21.62
		RB1#49	22.27	21.79	21.36	22.27	21.79	21.36
		RB25#0	21.18	20.76	20.53	21.18	20.76	20.53
		RB25#25	21.28	20.69	20.32	21.28	20.69	20.32
		RB50#0	21.24	20.75	20.42	21.24	20.75	20.42
	16QAM	RB1#0	21.47	21.33	20.61	21.47	21.33	20.61
		RB1#25	21.29	21.05	19.98	21.29	21.05	19.98
		RB1#49	21.25	21.13	19.49	21.25	21.13	19.49
		RB25#0	20.22	19.89	19.68	20.22	19.89	19.68
		RB25#25	20.32	19.71	19.53	20.32	19.71	19.53
		RB50#0	20.24	19.82	19.41	20.24	19.82	19.41

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	22.38	21.70	21.81	22.38	21.70	21.81
		RB1#38	22.07	21.46	21.32	22.07	21.46	21.32
		RB1#74	22.01	21.81	21.36	22.01	21.81	21.36
		RB36#0	21.10	20.78	20.64	21.10	20.78	20.64
		RB36#39	21.19	20.81	20.24	21.19	20.81	20.24
		RB75#0	21.04	20.75	20.51	21.04	20.75	20.51
	16QAM	RB1#0	21.38	21.22	21.02	21.38	21.22	21.02
		RB1#38	21.06	20.69	20.51	21.06	20.69	20.51
		RB1#74	21.15	21.68	20.51	21.15	21.68	20.51
		RB36#0	20.12	19.80	19.65	20.12	19.80	19.65
		RB36#39	20.18	19.74	19.25	20.18	19.74	19.25
		RB75#0	20.05	19.74	19.53	20.05	19.74	19.53
20.0	QPSK	RB1#0	22.54	22.19	21.71	22.54	22.19	21.71
		RB1#50	22.10	21.96	21.48	22.10	21.96	21.48
		RB1#99	22.24	21.74	21.11	22.24	21.74	21.11
		RB50#0	21.24	20.69	20.67	21.24	20.69	20.67
		RB50#50	21.08	20.59	20.21	21.08	20.59	20.21
		RB100#0	21.05	20.66	20.64	21.05	20.66	20.64
	16QAM	RB1#0	21.48	21.07	21.24	21.48	21.07	21.24
		RB1#50	21.21	20.87	21.21	21.21	20.87	21.21
		RB1#99	20.56	21.12	20.57	20.56	21.12	20.57
		RB50#0	20.32	19.95	19.76	20.32	19.95	19.76
		RB50#50	20.16	19.78	19.44	20.16	19.78	19.44
		RB100#0	20.16	19.72	19.68	20.16	19.72	19.68

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable Loss(dB)
 For Band7: Antenna Gain = 0.8dBi(provided by the applicant)
 Cable Loss=0.8dB*(provided by the applicant)
 Limit: EIRP≤33dBm

LTE Band12

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	23.97	24.03	23.80	21.82	21.88	21.65
		RB1#3	23.99	23.99	23.96	21.84	21.84	21.81
		RB1#5	23.97	23.87	23.82	21.82	21.72	21.67
		RB3#0	23.99	23.92	23.86	21.84	21.77	21.71
		RB3#3	23.83	23.82	23.87	21.68	21.67	21.72
		RB6#0	22.94	23.05	22.81	20.79	20.90	20.66
	16QAM	RB1#0	22.82	22.54	22.26	20.67	20.39	20.11
		RB1#3	23.10	22.86	22.77	20.95	20.71	20.62
		RB1#5	23.04	22.94	22.27	20.89	20.79	20.12
		RB3#0	22.38	22.76	23.01	20.23	20.61	20.86
		RB3#3	22.67	22.81	22.56	20.52	20.66	20.41
		RB6#0	22.15	22.04	21.80	20.00	19.89	19.65
3.0	QPSK	RB1#0	23.89	23.74	23.56	21.74	21.59	21.41
		RB1#8	23.89	23.87	23.74	21.74	21.72	21.59
		RB1#14	23.84	23.91	23.89	21.69	21.76	21.74
		RB6#0	22.99	22.92	22.70	20.84	20.77	20.55
		RB6#9	22.77	22.93	22.86	20.62	20.78	20.71
		RB15#0	22.89	22.86	22.73	20.74	20.71	20.58
	16QAM	RB1#0	22.86	23.15	22.74	20.71	21.00	20.59
		RB1#8	22.69	23.50	21.80	20.54	21.35	19.65
		RB1#14	22.72	23.43	22.34	20.57	21.28	20.19
		RB6#0	21.92	22.30	21.72	19.77	20.15	19.57
		RB6#9	21.77	22.31	22.10	19.62	20.16	19.95
		RB15#0	22.00	22.18	21.73	19.85	20.03	19.58

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	23.81	23.87	23.60	21.66	21.72	21.45
		RB1#13	23.46	23.87	23.49	21.31	21.72	21.34
		RB1#24	23.84	23.67	24.07	21.69	21.52	21.92
		RB15#0	22.91	22.87	22.72	20.76	20.72	20.57
		RB15#10	22.80	22.84	22.76	20.65	20.69	20.61
		RB25#0	22.81	22.79	22.75	20.66	20.64	20.60
	16QAM	RB1#0	22.17	23.02	22.37	20.02	20.87	20.22
		RB1#13	21.81	23.06	22.21	19.66	20.91	20.06
		RB1#24	21.90	22.85	22.84	19.75	20.70	20.69
		RB15#0	21.78	21.78	21.59	19.63	19.63	19.44
		RB15#10	21.79	21.75	21.64	19.64	19.60	19.49
		RB25#0	22.02	21.72	21.73	19.87	19.57	19.58
10.0	QPSK	RB1#0	24.05	23.80	24.24	21.90	21.65	22.09
		RB1#25	24.15	24.16	24.09	22.00	22.01	21.94
		RB1#49	23.81	23.69	23.95	21.66	21.54	21.80
		RB25#0	22.69	22.77	22.93	20.54	20.62	20.78
		RB25#25	22.95	22.77	22.75	20.80	20.62	20.60
		RB50#0	22.88	22.78	22.86	20.73	20.63	20.71
	16QAM	RB1#0	23.04	22.86	22.96	20.89	20.71	20.81
		RB1#25	23.27	23.61	22.14	21.12	21.46	19.99
		RB1#49	23.07	23.30	22.37	20.92	21.15	20.22
		RB25#0	21.84	21.97	22.18	19.69	19.82	20.03
		RB25#25	22.05	21.92	22.25	19.90	19.77	20.10
		RB50#0	21.84	21.74	22.24	19.69	19.59	20.09

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)
 For Band12: Antenna Gain = 0.5dBi = -1.65dBd (0dBd=2.15dBi)(provided by the applicant)
 Cable Loss=0.5dB*(provided by the applicant)
 Limit: ERP ≤ 34.77dBm

LTE Band13

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	23.88	23.93	23.91	21.73	21.78	21.76
		RB1#13	23.91	23.98	23.60	21.76	21.83	21.45
		RB1#24	23.77	24.05	23.76	21.62	21.90	21.61
		RB15#0	23.04	22.99	23.01	20.89	20.84	20.86
		RB15#10	22.88	22.94	22.91	20.73	20.79	20.76
		RB25#0	22.88	22.93	23.01	20.73	20.78	20.86
	16QAM	RB1#0	22.43	23.04	22.92	20.28	20.89	20.77
		RB1#13	22.00	22.50	22.66	19.85	20.35	20.51
		RB1#24	22.01	22.49	22.49	19.86	20.34	20.34
		RB15#0	22.02	21.75	21.82	19.87	19.60	19.67
		RB15#10	21.89	21.90	21.71	19.74	19.75	19.56
		RB25#0	22.13	21.90	22.11	19.98	19.75	19.96
10.0	QPSK	RB1#0	/	24.12	/	/	21.97	/
		RB1#25	/	24.04	/	/	21.89	/
		RB1#49	/	24.20	/	/	22.05	/
		RB25#0	/	22.95	/	/	20.80	/
		RB25#25	/	22.97	/	/	20.82	/
		RB50#0	/	23.01	/	/	20.86	/
	16QAM	RB1#0	/	23.29	/	/	21.14	/
		RB1#25	/	23.02	/	/	20.87	/
		RB1#49	/	23.00	/	/	20.85	/
		RB25#0	/	22.05	/	/	19.90	/
		RB25#25	/	21.87	/	/	19.72	/
		RB50#0	/	22.00	/	/	19.85	/

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)
 For Band13: Antenna Gain = 0.5dBi = -1.65dBd (0dBd=2.15dBi)(provided by the applicant)
 Cable Loss=0.5dB*(provided by the applicant)
 Limit: ERP ≤ 34.77dBm

LTE Band 25:

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	22.50	22.58	22.39	22.50	22.58	22.39
		RB1#3	22.41	22.58	22.44	22.41	22.58	22.44
		RB1#5	22.24	22.41	22.35	22.24	22.41	22.35
		RB3#0	22.37	22.53	22.29	22.37	22.53	22.29
		RB3#3	22.33	22.36	22.34	22.33	22.36	22.34
		RB6#0	21.45	21.47	21.44	21.45	21.47	21.44
	16QAM	RB1#0	21.61	21.72	21.43	21.61	21.72	21.43
		RB1#3	21.61	22.21	21.49	21.61	22.21	21.49
		RB1#5	21.70	22.28	21.38	21.70	22.28	21.38
		RB3#0	21.25	21.13	21.44	21.25	21.13	21.44
		RB3#3	21.28	21.13	21.58	21.28	21.13	21.58
		RB6#0	20.49	20.56	20.35	20.49	20.56	20.35
3.0	QPSK	RB1#0	22.22	22.28	22.26	22.22	22.28	22.26
		RB1#8	22.13	22.25	22.15	22.13	22.25	22.15
		RB1#14	22.05	22.28	22.29	22.05	22.28	22.29
		RB6#0	21.44	21.46	21.41	21.44	21.46	21.41
		RB6#9	21.33	21.29	21.45	21.33	21.29	21.45
		RB15#0	21.35	21.42	21.39	21.35	21.42	21.39
	16QAM	RB1#0	21.44	21.56	21.12	21.44	21.56	21.12
		RB1#8	21.29	21.44	20.70	21.29	21.44	20.70
		RB1#14	21.10	21.74	20.92	21.10	21.74	20.92
		RB6#0	20.37	20.55	20.38	20.37	20.55	20.38
		RB6#9	20.27	20.48	20.36	20.27	20.48	20.36
		RB15#0	20.42	20.56	20.49	20.42	20.56	20.49

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QP SK	RB1#0	22.23	22.48	22.30	22.23	22.48	22.30
		RB1#13	21.95	22.27	22.30	21.95	22.27	22.30
		RB1#24	22.08	22.31	22.28	22.08	22.31	22.28
		RB15#0	21.39	21.36	21.43	21.39	21.36	21.43
		RB15#10	21.17	21.18	21.49	21.17	21.18	21.49
		RB25#0	21.33	21.35	21.36	21.33	21.35	21.36
	16QAM	RB1#0	21.15	21.47	20.89	21.15	21.47	20.89
		RB1#13	20.30	21.07	21.03	20.30	21.07	21.03
		RB1#24	20.09	21.23	20.88	20.09	21.23	20.88
		RB15#0	20.20	20.21	20.37	20.20	20.21	20.37
		RB15#10	19.98	20.03	20.29	19.98	20.03	20.29
		RB25#0	20.38	20.31	20.35	20.38	20.31	20.35
10.0	QPSK	RB1#0	22.54	22.35	22.58	22.54	22.35	22.58
		RB1#25	22.50	22.49	22.39	22.50	22.49	22.39
		RB1#49	22.25	22.27	22.44	22.25	22.27	22.44
		RB25#0	21.41	21.41	21.58	21.41	21.41	21.58
		RB25#25	21.17	21.27	21.41	21.17	21.27	21.41
		RB50#0	21.23	21.39	21.53	21.23	21.39	21.53
	16QAM	RB1#0	21.94	21.60	21.56	21.94	21.60	21.56
		RB1#25	21.45	21.71	21.09	21.45	21.71	21.09
		RB1#49	21.18	21.56	21.42	21.18	21.56	21.42
		RB25#0	20.32	20.41	20.63	20.32	20.41	20.63
		RB25#25	20.04	20.37	20.37	20.04	20.37	20.37
		RB50#0	20.33	20.52	20.49	20.33	20.52	20.49

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	22.41	22.59	22.76	22.41	22.59	22.76
		RB1#38	22.14	22.31	22.53	22.14	22.31	22.53
		RB1#74	22.34	22.25	22.35	22.34	22.25	22.35
		RB36#0	21.33	21.41	21.59	21.33	21.41	21.59
		RB36#39	21.26	21.28	21.38	21.26	21.28	21.38
		RB75#0	21.17	21.42	21.48	21.17	21.42	21.48
	16QAM	RB1#0	21.37	21.64	21.84	21.37	21.64	21.84
		RB1#38	21.24	21.29	21.65	21.24	21.29	21.65
		RB1#74	21.64	21.50	21.63	21.64	21.50	21.63
		RB36#0	20.26	20.56	20.73	20.26	20.56	20.73
		RB36#39	20.15	20.29	20.60	20.15	20.29	20.60
		RB75#0	20.32	20.53	20.67	20.32	20.53	20.67
20.0	QPSK	RB1#0	22.72	22.68	22.73	22.72	22.68	22.73
		RB1#50	22.38	22.41	22.94	22.38	22.41	22.94
		RB1#99	22.20	22.61	22.51	22.20	22.61	22.51
		RB50#0	21.29	21.55	21.61	21.29	21.55	21.61
		RB50#50	21.24	21.36	21.43	21.24	21.36	21.43
		RB100#0	21.30	21.49	21.56	21.30	21.49	21.56
	16QAM	RB1#0	21.17	22.02	22.24	21.17	22.02	22.24
		RB1#50	21.14	21.54	22.76	21.14	21.54	22.76
		RB1#99	20.77	21.95	21.81	20.77	21.95	21.81
		RB50#0	20.25	20.71	20.66	20.25	20.71	20.66
		RB50#50	20.30	20.30	20.37	20.30	20.30	20.37
		RB100#0	20.27	20.48	20.63	20.27	20.48	20.63

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi) - Cable Loss(dB)
 For Band 25: Antenna Gain =0.8dBi(provided by the applicant)
 Cable Loss=0.8dB*(provided by the applicant)
 Limit: EIRP ≤ 33dBm

LTE Band 26(Part 90S):

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	22.84	22.77	22.97	20.69	20.62	20.82
		RB1#3	23.03	22.85	23.20	20.88	20.7	21.05
		RB1#5	22.93	22.68	23.09	20.78	20.53	20.94
		RB3#0	22.87	22.83	23.03	20.72	20.68	20.88
		RB3#3	22.94	22.80	23.03	20.79	20.65	20.88
		RB6#0	21.74	21.83	22.02	19.59	19.68	19.87
	16QAM	RB1#0	22.00	21.99	22.20	19.85	19.84	20.05
		RB1#3	22.43	21.78	22.32	20.28	19.63	20.17
		RB1#5	22.51	21.29	22.22	20.36	19.14	20.07
		RB3#0	22.04	21.95	21.73	19.89	19.8	19.58
		RB3#3	21.68	21.70	21.80	19.53	19.55	19.65
		RB6#0	20.79	20.99	21.06	18.64	18.84	18.91
3.0	QPSK	RB1#0	22.68	23.03	22.84	20.53	20.88	20.69
		RB1#8	22.67	22.76	22.79	20.52	20.61	20.64
		RB1#14	22.79	22.86	23.00	20.64	20.71	20.85
		RB6#0	21.67	21.89	22.01	19.52	19.74	19.86
		RB6#9	21.66	21.81	21.97	19.51	19.66	19.82
		RB15#0	21.73	21.91	22.04	19.58	19.76	19.89
	16QAM	RB1#0	21.75	22.44	21.72	19.60	20.29	19.57
		RB1#8	21.71	22.30	21.50	19.56	20.15	19.35
		RB1#14	21.67	22.17	21.58	19.52	20.02	19.43
		RB6#0	20.84	21.19	21.01	18.69	19.04	18.86
		RB6#9	20.74	20.95	21.05	18.59	18.80	18.90
		RB15#0	20.95	21.06	21.02	18.80	18.91	18.87

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QP SK	RB1#0	22.55	22.78	22.98	20.40	20.63	20.83
		RB1#13	22.74	22.90	22.86	20.59	20.75	20.71
		RB1#24	22.77	23.11	23.04	20.62	20.96	20.89
		RB15#0	21.81	21.90	21.86	19.66	19.75	19.71
		RB15#10	21.77	21.83	22.00	19.62	19.68	19.85
		RB25#0	21.79	21.83	21.97	19.64	19.68	19.82
	16QAM	RB1#0	21.05	21.82	21.39	18.90	19.67	19.24
		RB1#13	20.82	21.74	21.64	18.67	19.59	19.49
		RB1#24	20.90	21.81	21.76	18.75	19.66	19.61
		RB15#0	20.67	20.82	20.80	18.52	18.67	18.65
		RB15#10	20.72	20.67	20.94	18.57	18.52	18.79
		RB25#0	20.85	20.94	20.93	18.70	18.79	18.78
10.0	QPSK	RB1#0	/	22.90	/	/	20.75	/
		RB1#25	/	22.97	/	/	20.82	/
		RB1#49	/	23.02	/	/	20.87	/
		RB25#0	/	21.90	/	/	19.75	/
		RB25#25	/	22.03	/	/	19.88	/
		RB50#0	/	21.99	/	/	19.84	/
	16QAM	RB1#0	/	22.23	/	/	20.08	/
		RB1#25	/	22.03	/	/	19.88	/
		RB1#49	/	22.00	/	/	19.85	/
		RB25#0	/	20.75	/	/	18.60	/
		RB25#25	/	21.00	/	/	18.85	/
		RB50#0	/	20.90	/	/	18.75	/

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd) - Cable Loss(dB)
 For Band26: Antenna Gain = 0.5dBi* = -1.65dBd (0dBd=2.15dBi)(provided by the applicant)
 Cable Loss=0.5dB*(provided by the applicant)
 Limit: ERP ≤ 50dBm

Peak-to-average ratio (PAR)

LTE Band 2 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.26	4.42	4.46	13	Pass
QPSK (100RB Size)	5.51	5.45	5.32	13	Pass
16QAM (1RB Size)	5.29	5.45	5.45	13	Pass
16QAM (100RB Size)	6.41	6.22	6.25	13	Pass

LTE Band 4 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.23	4.62	4.23	13	Pass
QPSK (100RB Size)	5.26	5.42	5.38	13	Pass
16QAM (1RB Size)	5.26	5.71	4.87	13	Pass
16QAM (100RB Size)	6.22	6.31	6.28	13	Pass

LTE Band 5/LTE Band 26(Part 22H) 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.55	4.74	4.46	13	Pass
QPSK (50RB Size)	5.48	5.32	5.51	13	Pass
16QAM (1RB Size)	5.38	5.74	5.38	13	Pass
16QAM (50RB Size)	6.38	6.28	6.35	13	Pass

LTE Band 7 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	3.91	4.23	3.78	13	Pass
QPSK (100RB Size)	5.32	5.29	5.10	13	Pass
16QAM (1RB Size)	4.71	5.19	4.55	13	Pass
16QAM (100RB Size)	6.19	6.28	5.96	13	Pass

LTE Band 12 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.78	4.90	4.94	13	Pass
QPSK (50RB Size)	5.64	5.71	5.54	13	Pass
16QAM (1RB Size)	5.90	5.64	5.99	13	Pass
16QAM (50RB Size)	6.60	6.60	6.51	13	Pass

LTE Band 13 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	/	4.01	/	13	Pass
QPSK (50RB Size)	/	5.35	/	13	Pass
16QAM (1RB Size)	/	4.94	/	13	Pass
16QAM (50RB Size)	/	6.25	/	13	Pass

LTE Band 25 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.42	4.65	4.42	13	Pass
QPSK (100RB Size)	5.61	5.54	5.42	13	Pass
16QAM (1RB Size)	5.61	5.61	5.58	13	Pass
16QAM (100RB Size)	6.54	6.51	6.44	13	Pass

LTE Band 26(Part 90S) 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	/	4.55	/	13	Pass
QPSK (100RB Size)	/	5.06	/	13	Pass
16QAM (1RB Size)	/	5.42	/	13	Pass
16QAM (100RB Size)	/	5.99	/	13	Pass

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

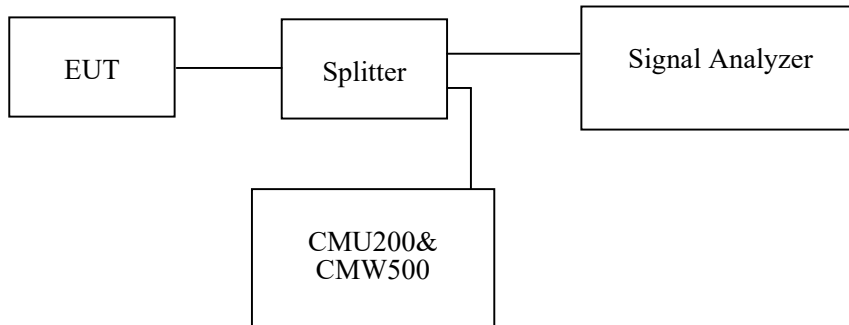
Applicable Standard

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:	26.2~28.6 °C
Relative Humidity:	52~60 %
ATM Pressure:	100.9~101.2 kPa

The testing was performed by Pedro Yun from 2021-05-14 to 2021-08-17.

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)
GPRS(GMSK)	128	824.2	250.00	322.95
	190	836.6	250.00	320.83
	251	848.8	245.00	321.15
EGPRS(8PSK)	128	824.2	242.50	315.00
	190	836.6	245.00	307.37
	251	848.8	240.00	316.99

	Frequency (MHz)	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	826.4	4.15	4.75
	836.6	4.15	4.74
	846.6	4.13	4.75
HSDPA	826.4	4.18	4.79
	836.6	4.15	4.71
	846.6	4.13	4.72
HSUPA	826.4	4.15	4.74
	836.6	4.15	4.71
	846.6	4.13	4.73

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GPRS(GMSK)	512	1850.2	246.79	318.91
	661	1880.0	245.19	317.63
	810	1909.8	250.00	320.19
EGPRS(8PSK)	512	1850.2	245.19	305.77
	661	1880.0	245.19	311.54
	810	1909.8	248.40	313.78

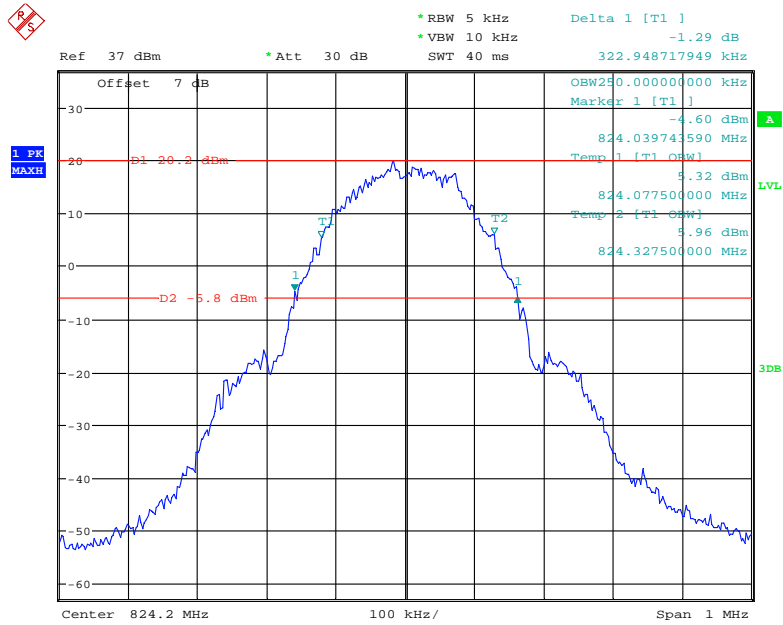
Frequency (MHz)		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	1852.4	4.17	4.75
	1880.0	4.17	4.71
	1907.6	4.15	4.74
HSDPA	1852.4	4.17	4.75
	1880.0	4.17	4.75
	1907.6	4.15	4.73
HSUPA	1852.4	4.17	4.75
	1880.0	4.17	4.76
	1907.6	4.17	4.71

AWS Band (Part 27)

Frequency (MHz)		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	1712.4	4.15	4.74
	1732.6	4.17	4.72
	1752.6	4.15	4.75
HSDPA	1712.4	4.18	4.74
	1732.6	4.17	4.72
	1752.6	4.17	4.72
HSUPA	1712.4	4.17	4.72
	1732.6	4.18	4.73
	1752.6	4.17	4.72

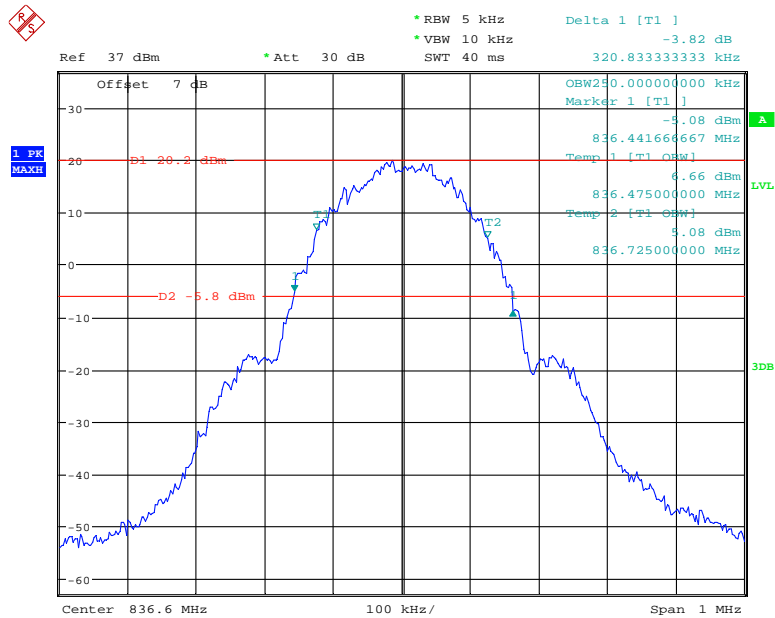
Cellular Band (Part 22H)

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



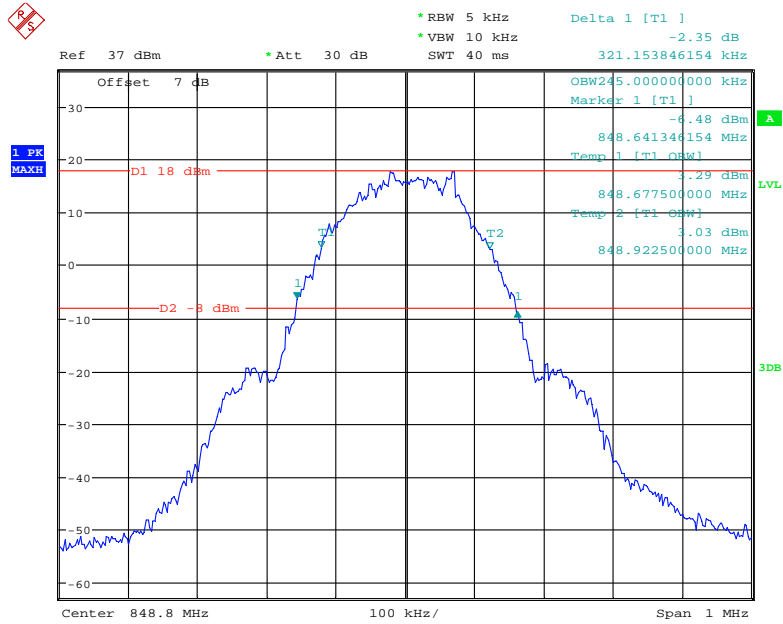
Date: 6.AUG.2021 23:56:04

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



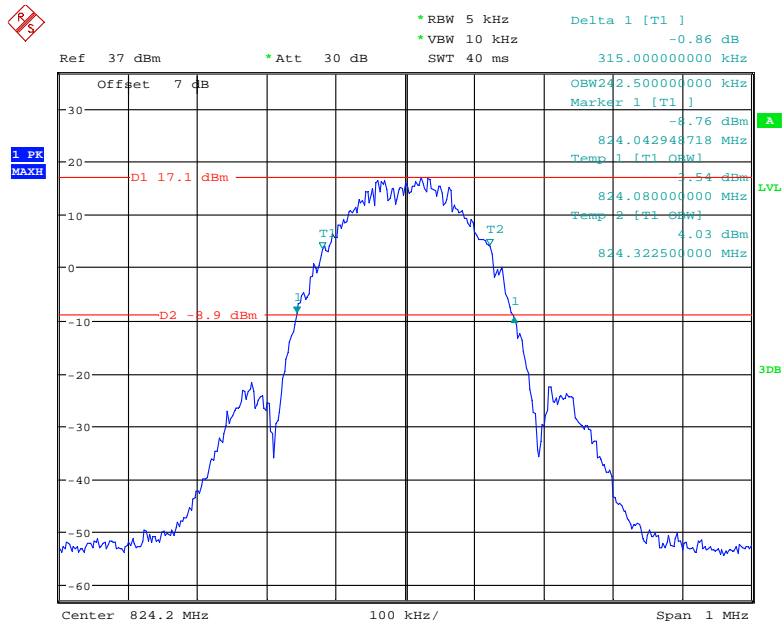
Date: 6.AUG.2021 23:57:27

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



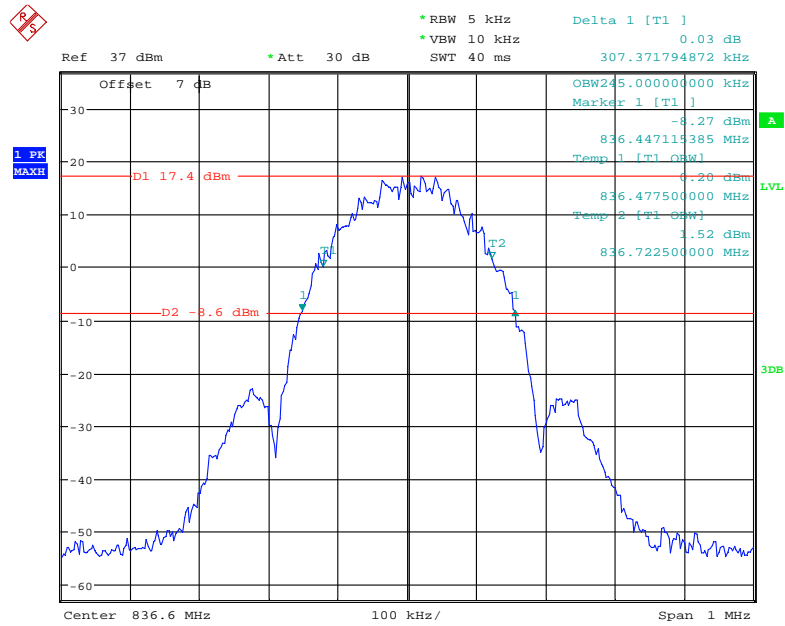
Date: 6.AUG.2021 23:58:26

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



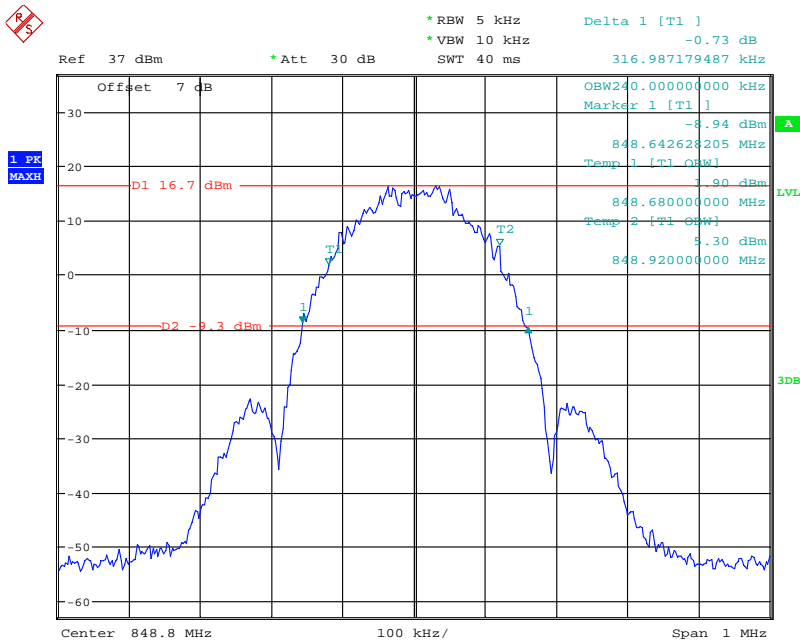
Date: 7.AUG.2021 00:03:38

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



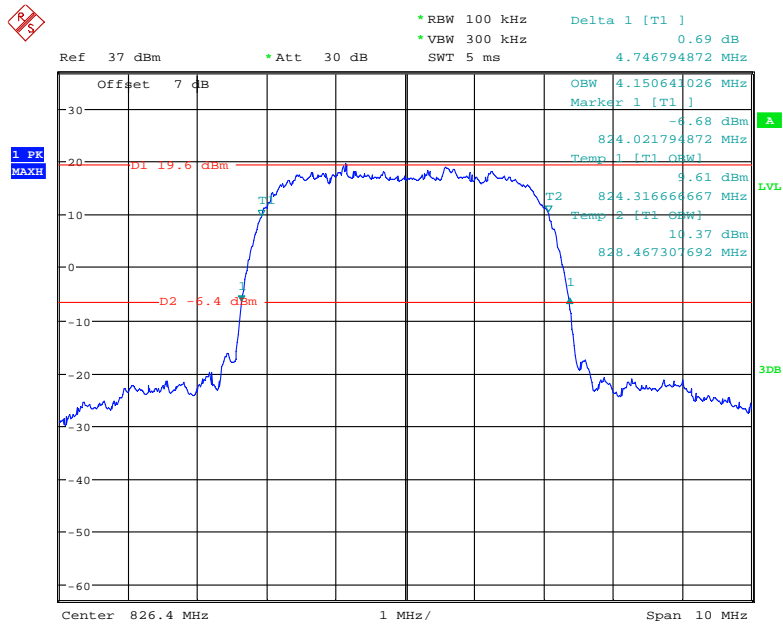
Date: 7.AUG.2021 00:04:47

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



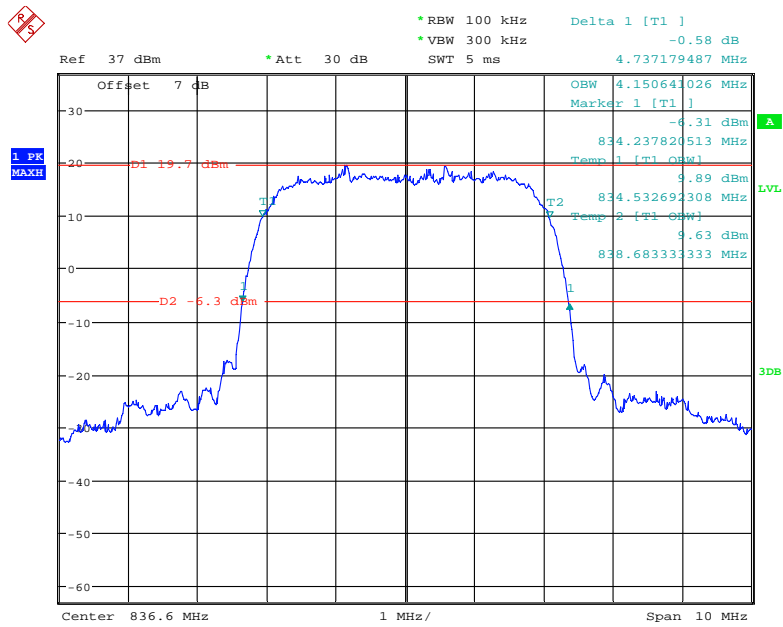
Date: 7.AUG.2021 00:06:16

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



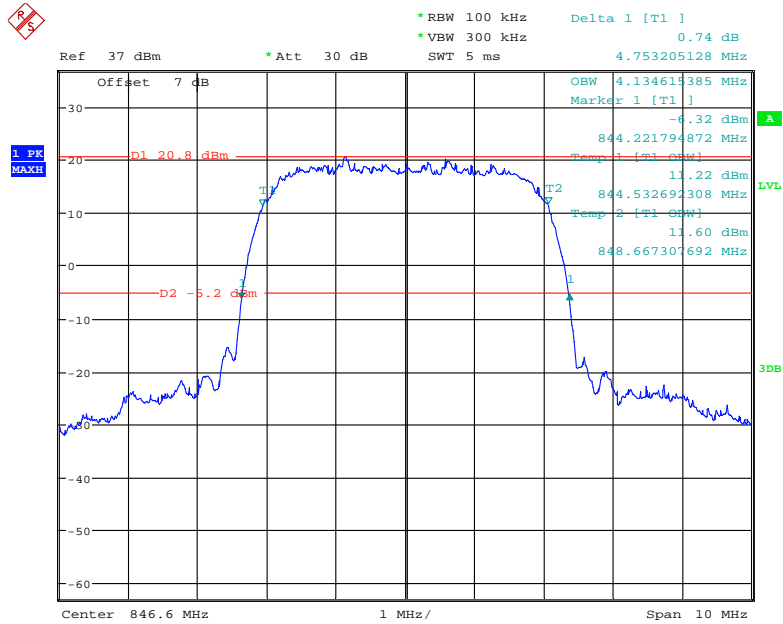
Date: 17.MAY.2021 23:54:31

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



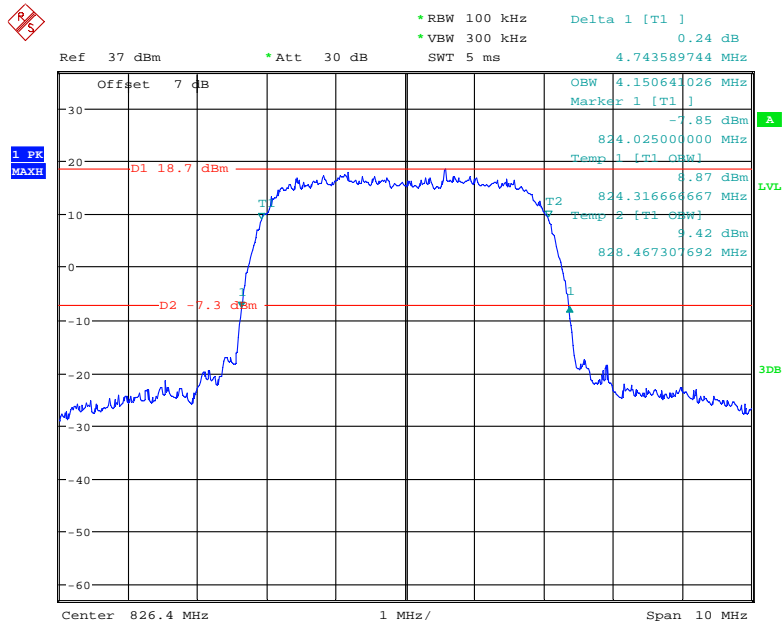
Date: 17.MAY.2021 23:56:30

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



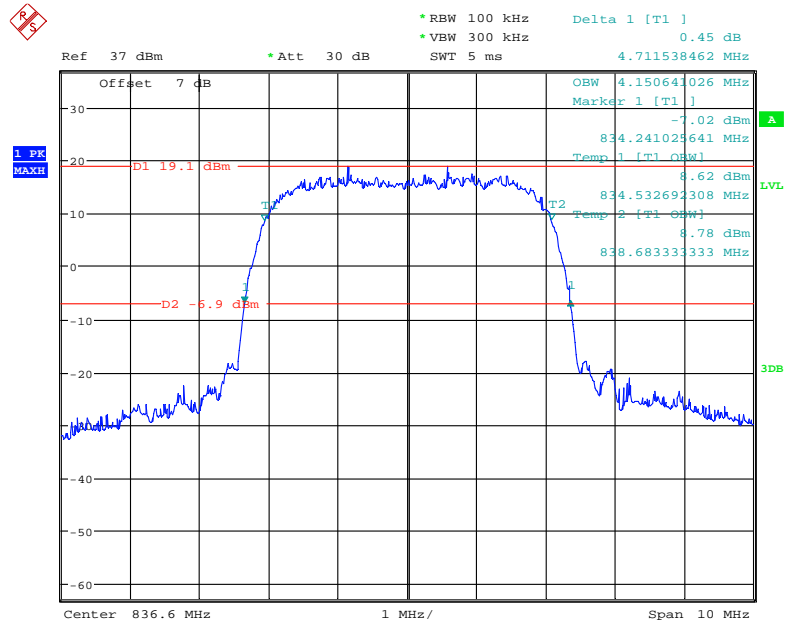
Date: 23.MAY.2021 22:52:03

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



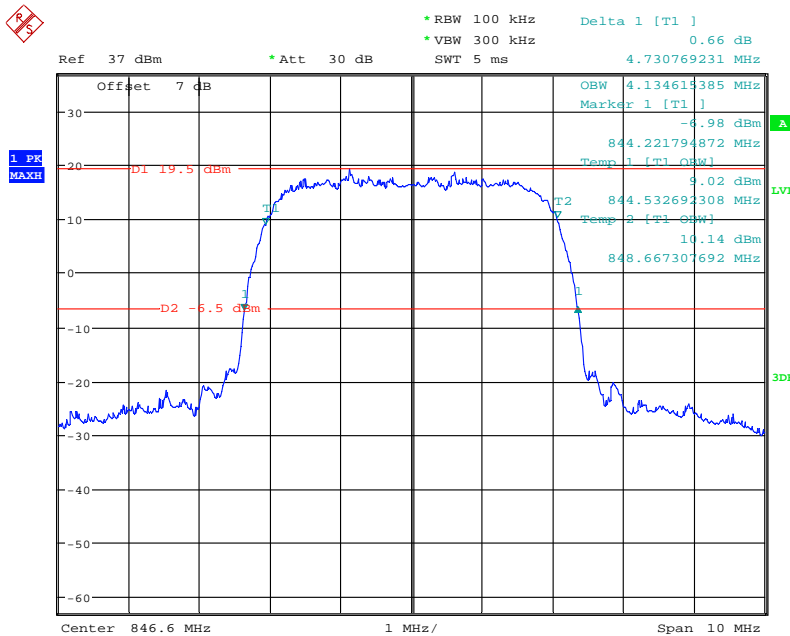
Date: 18.MAY.2021 00:32:25

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



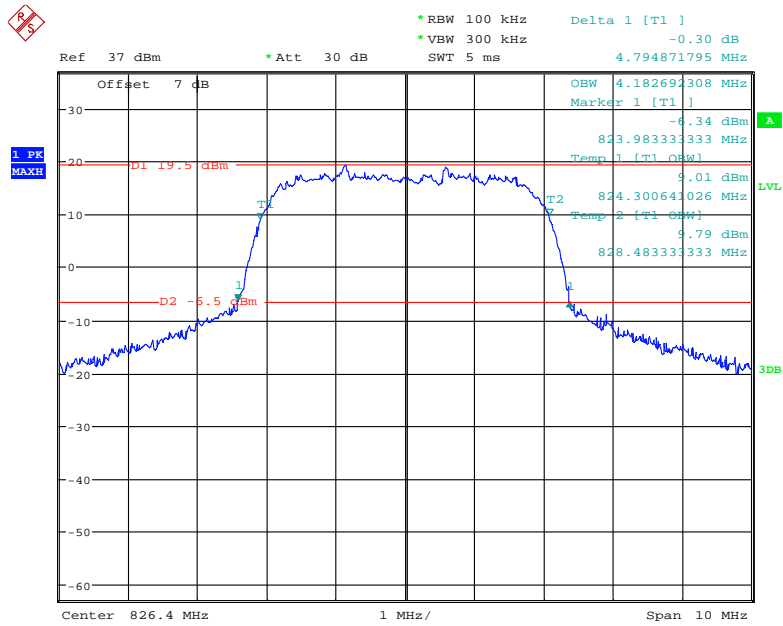
Date: 18.MAY.2021 00:34:03

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



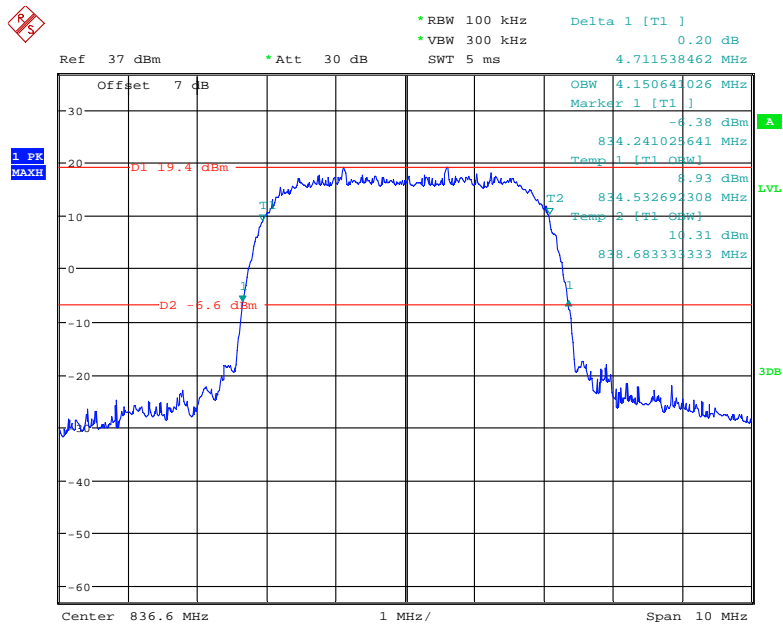
Date: 18.MAY.2021 00:36:10

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



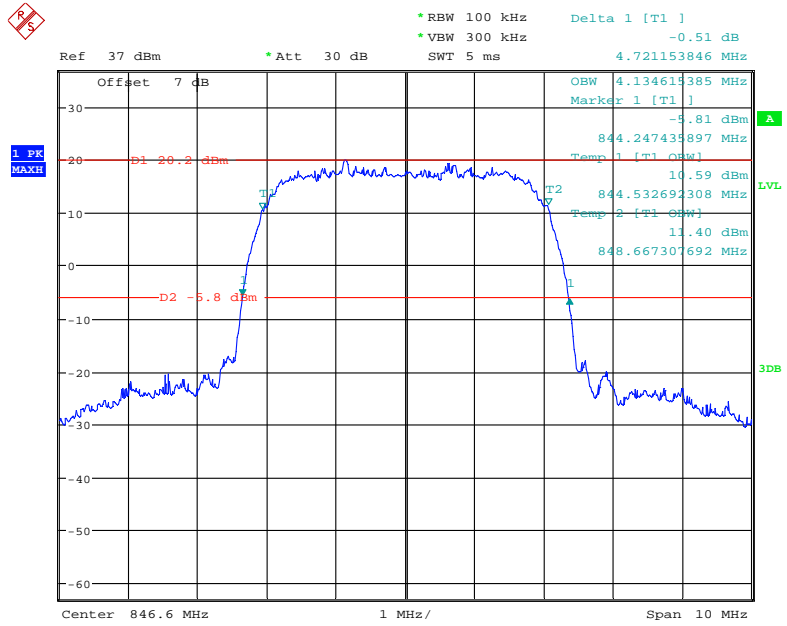
Date: 18.MAY.2021 00:15:08

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



Date: 18.MAY.2021 00:07:46

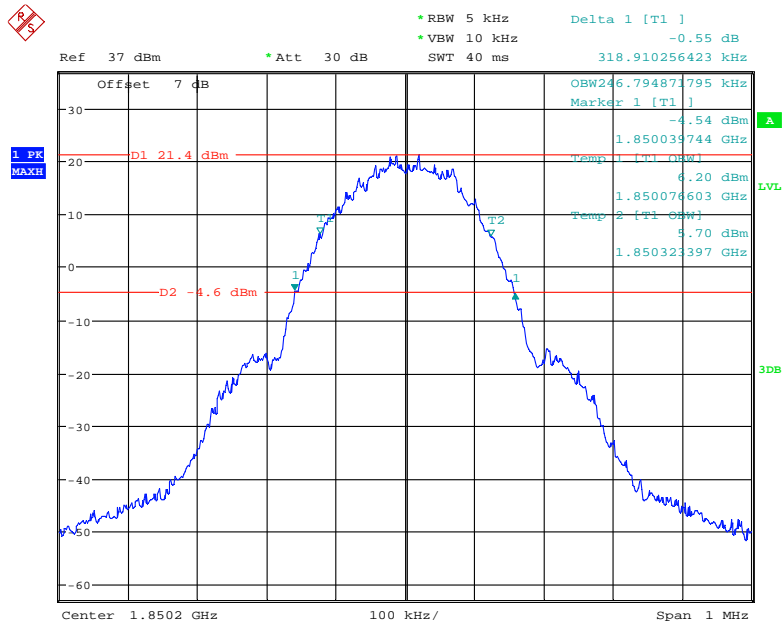
26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel



Date: 7.JUL.2021 22:20:12

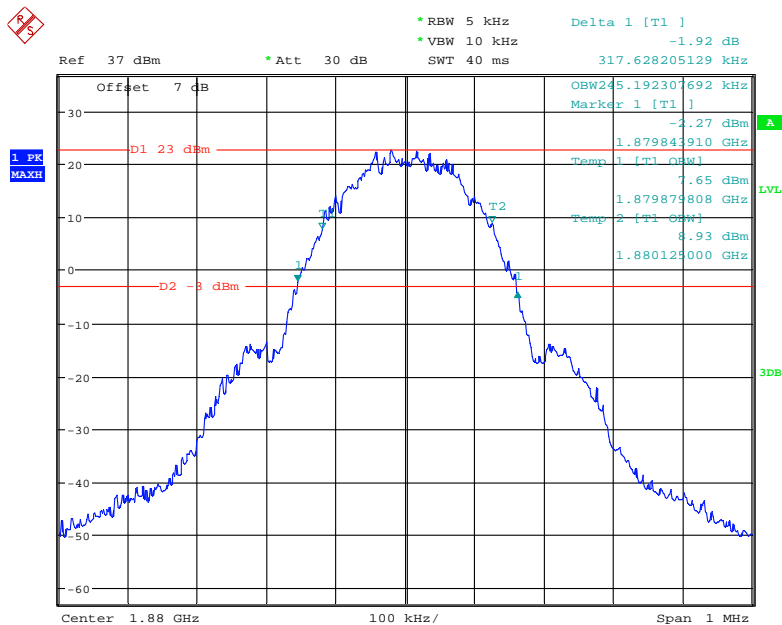
PCS Band (Part 24E)

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



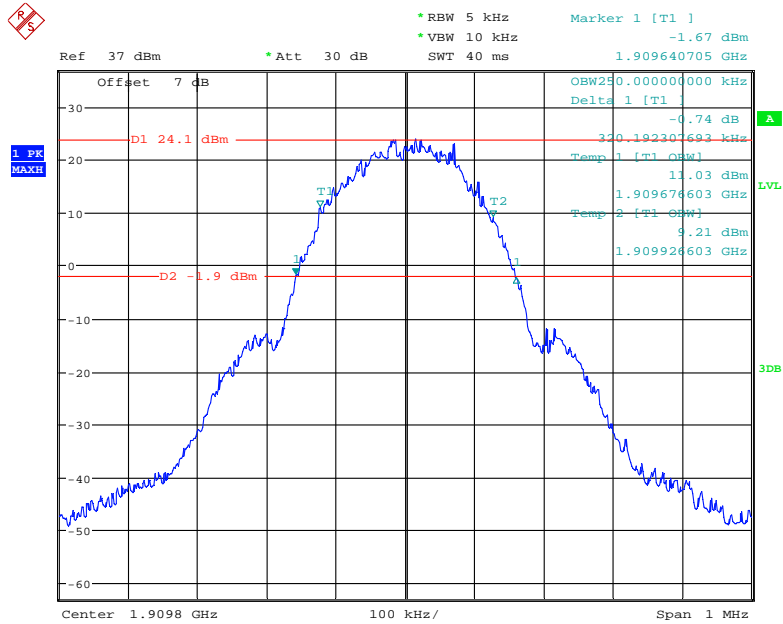
Date: 7.JUL.2021 22:02:44

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



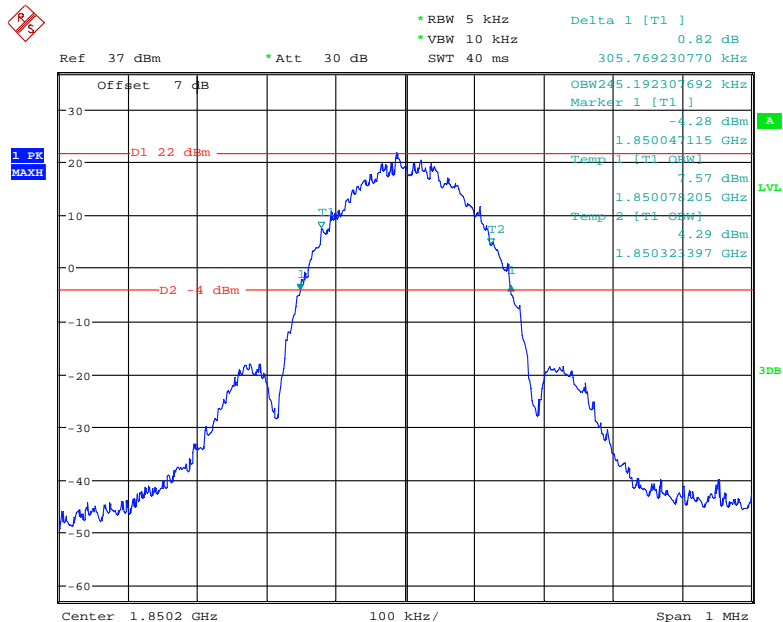
Date: 23.MAY.2021 23:25:14

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



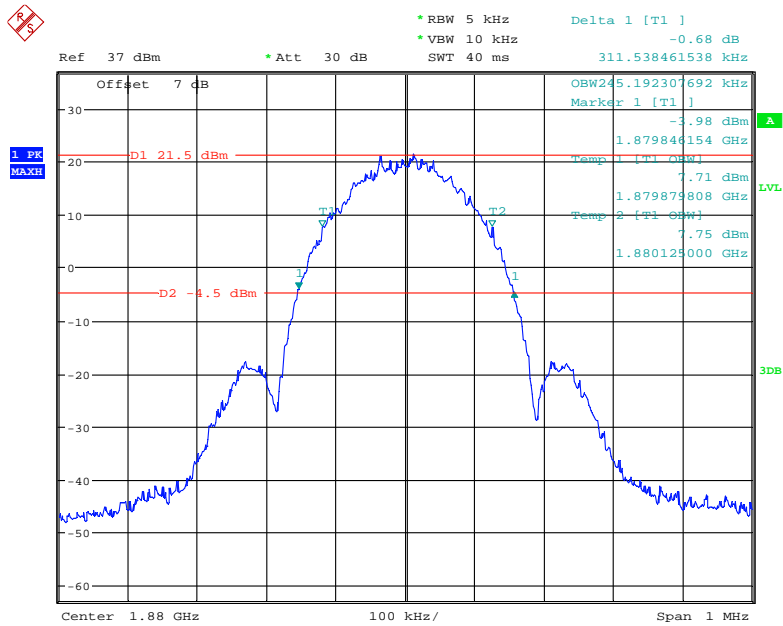
Date: 23.MAY.2021 23:26:43

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



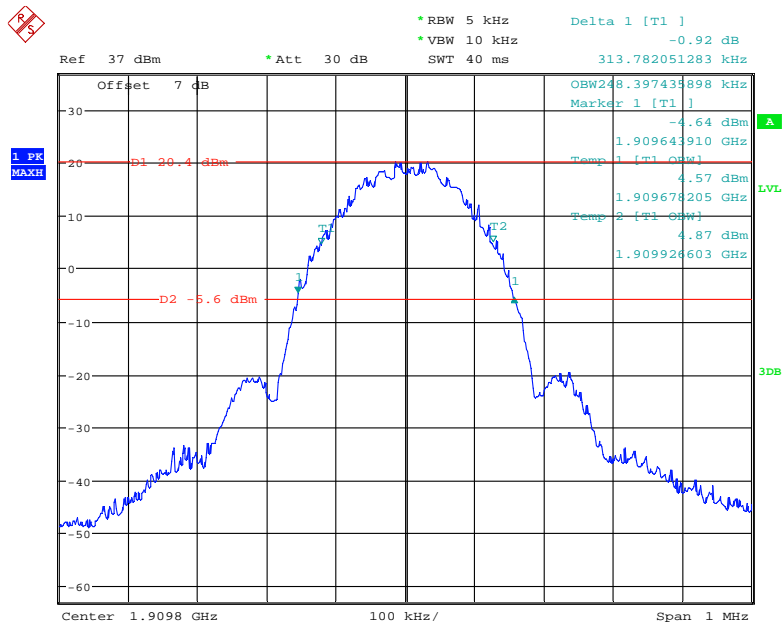
Date: 14.MAY.2021 23:56:58

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



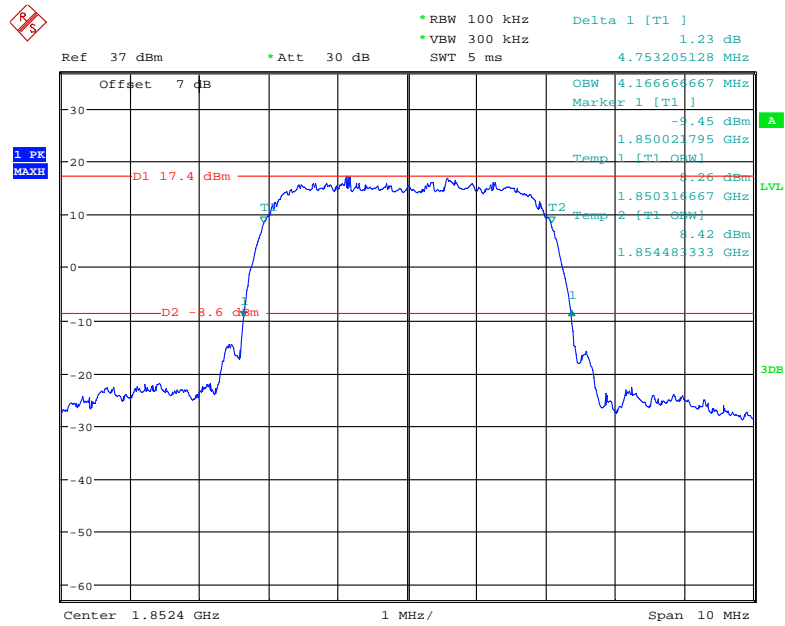
Date: 14.MAY.2021 23:54:58

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



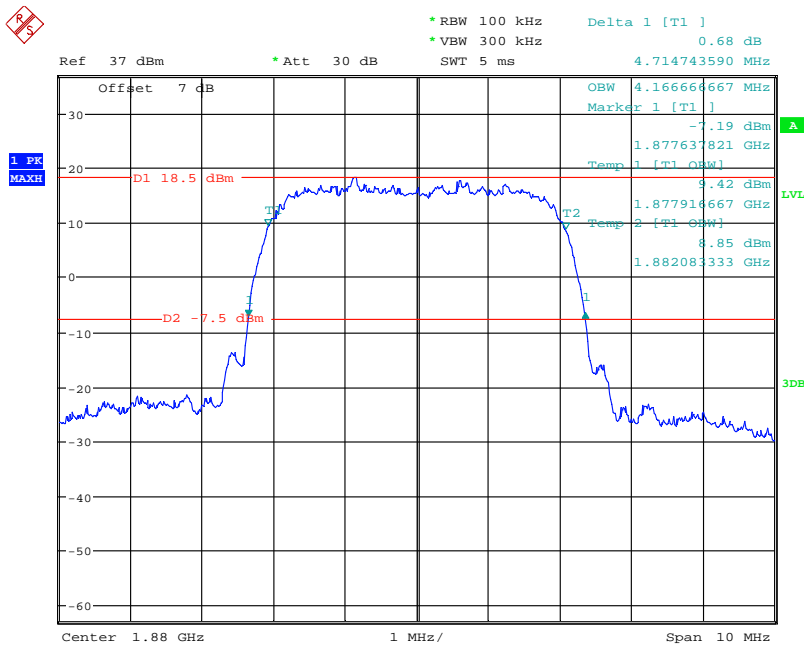
Date: 23.MAY.2021 23:32:06

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



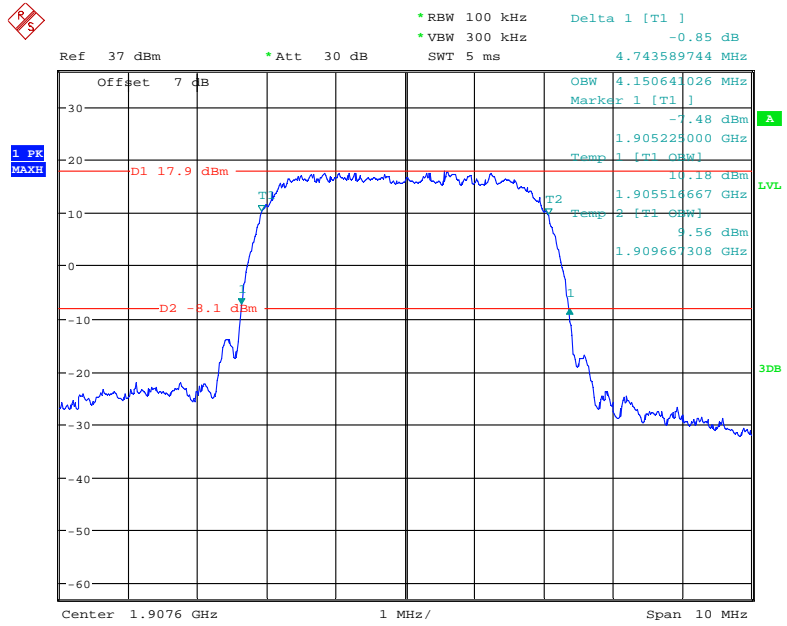
Date: 17.MAY.2021 23:51:55

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



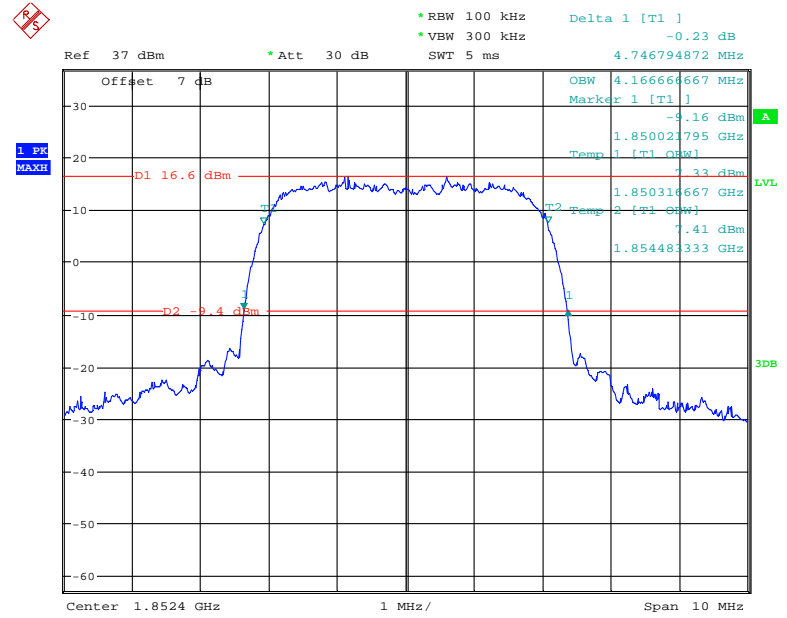
Date: 17.MAY.2021 23:49:48

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



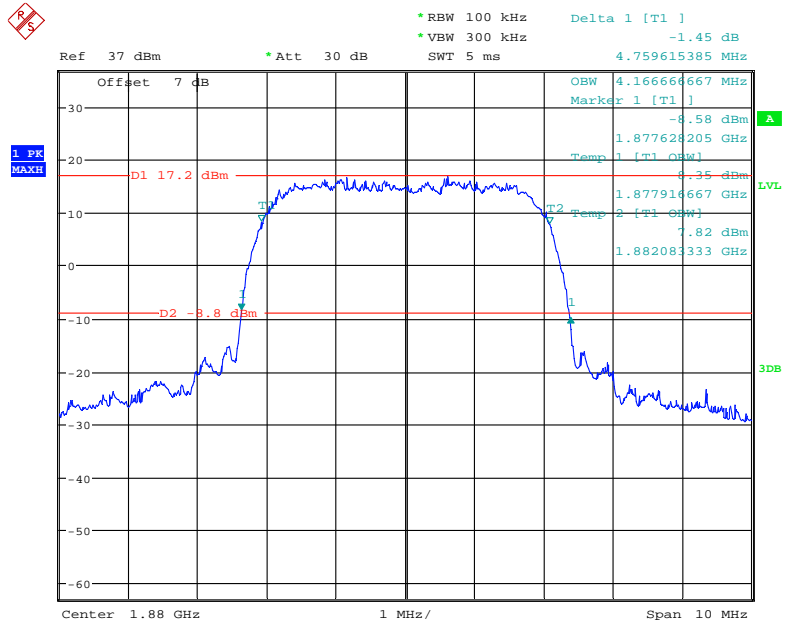
Date: 17.MAY.2021 23:47:31

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



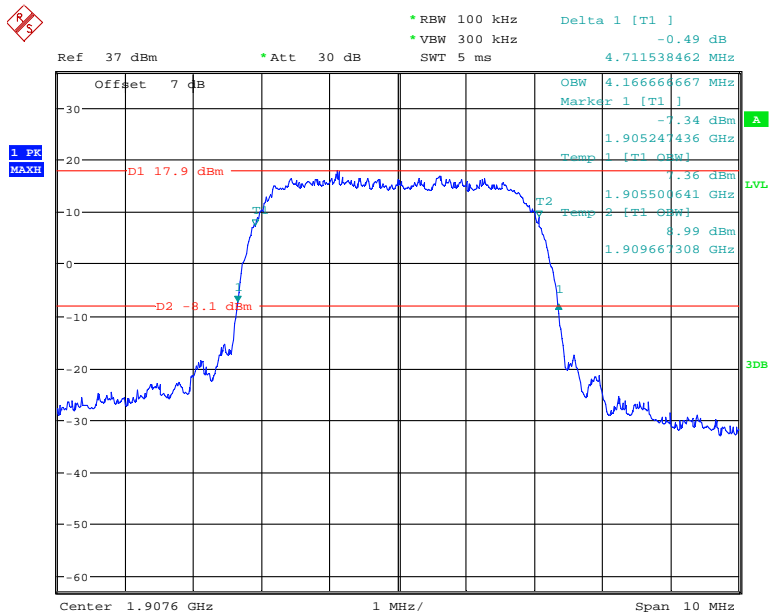
Date: 18.MAY.2021 00:30:39

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



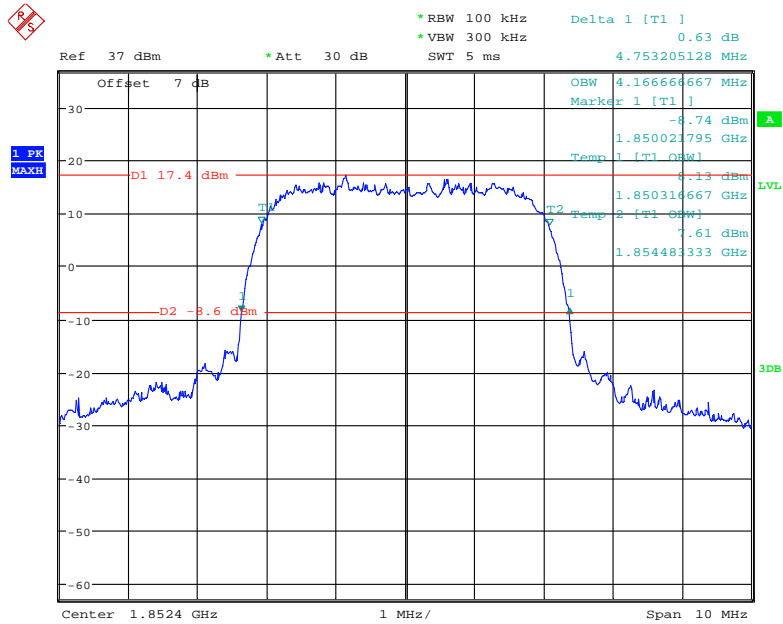
Date: 7.JUL.2021 22:12:49

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



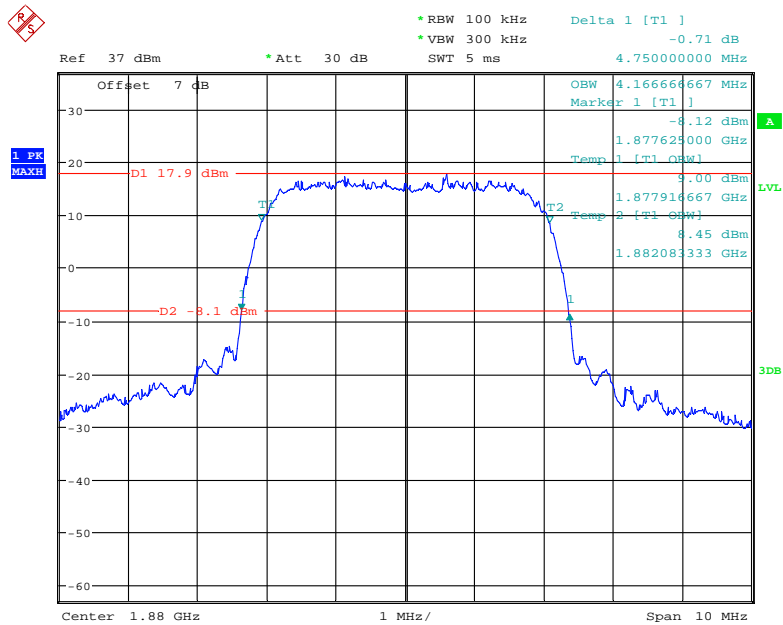
Date: 18.MAY.2021 00:24:07

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



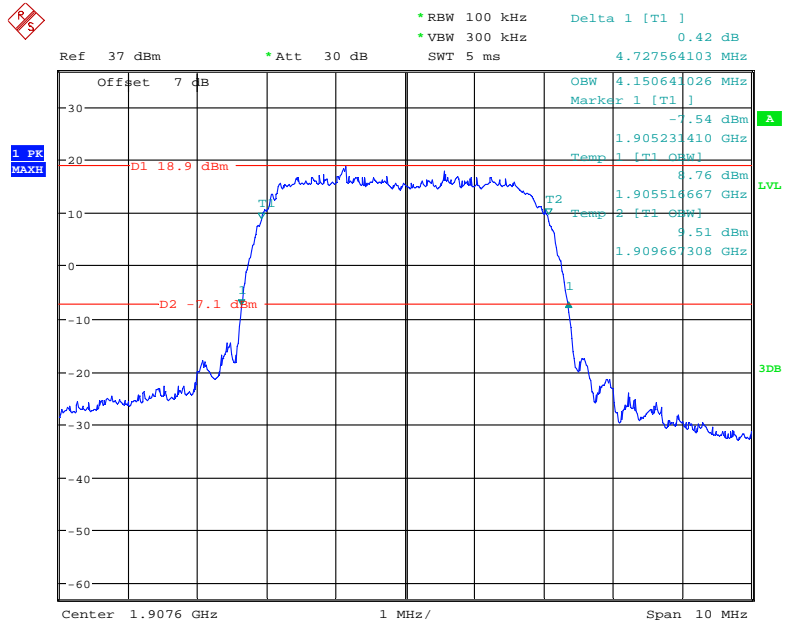
Date: 18.MAY.2021 00:17:35

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



Date: 18.MAY.2021 00:19:41

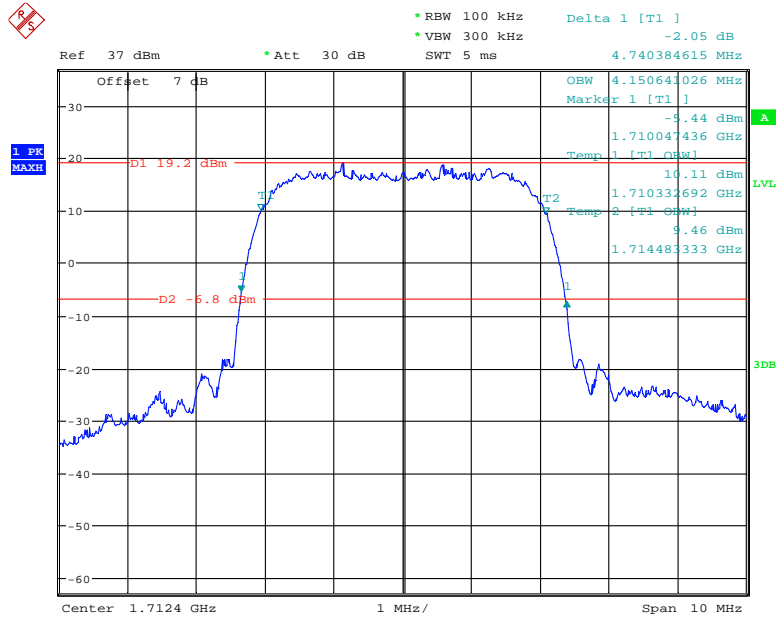
26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel



Date: 18.MAY.2021 00:21:36

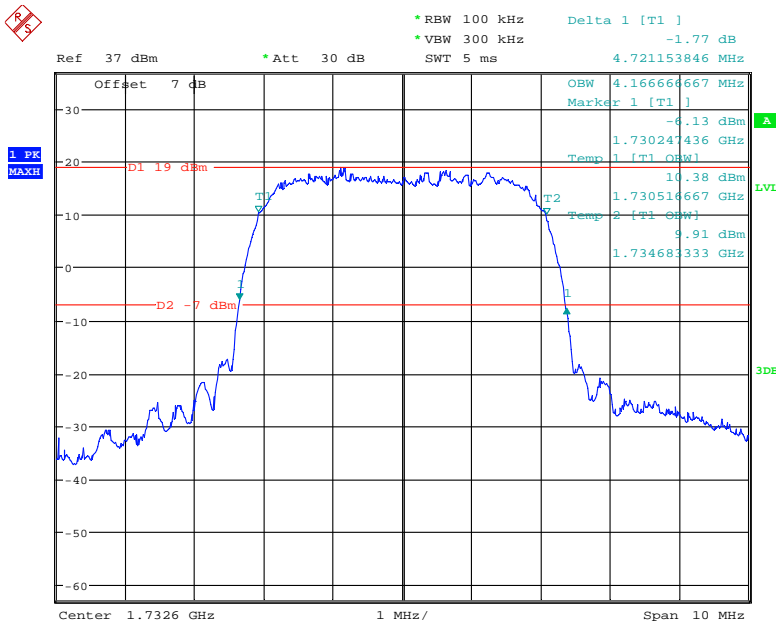
AWS Band (Part 27)

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



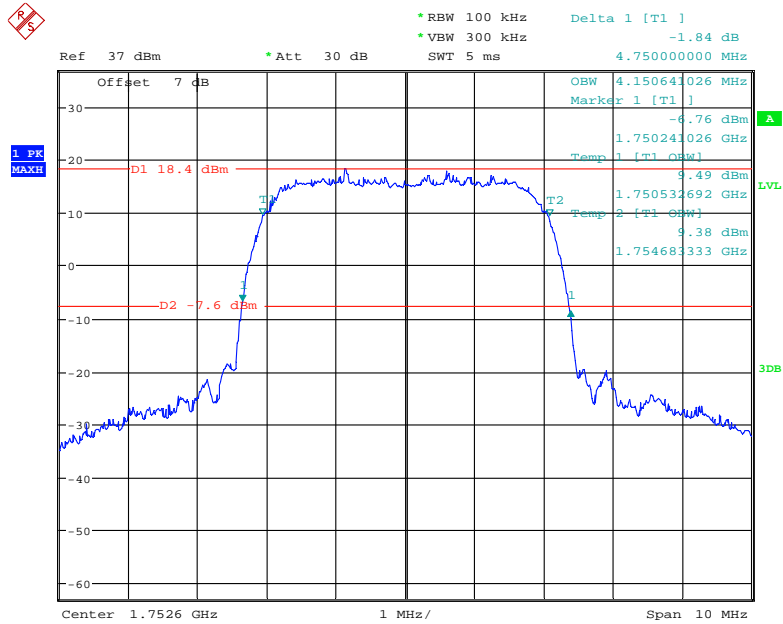
Date: 7.JUL.2021 22:30:04

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



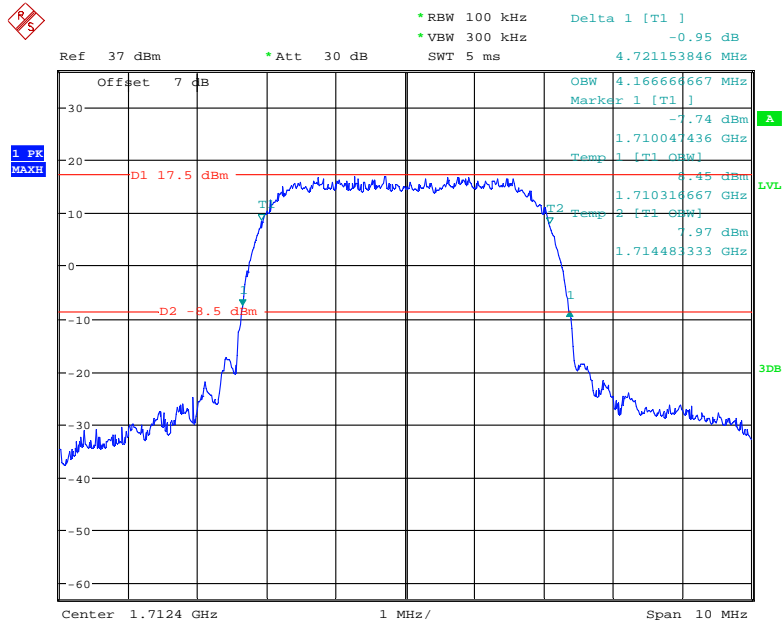
Date: 7.JUL.2021 22:31:08

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



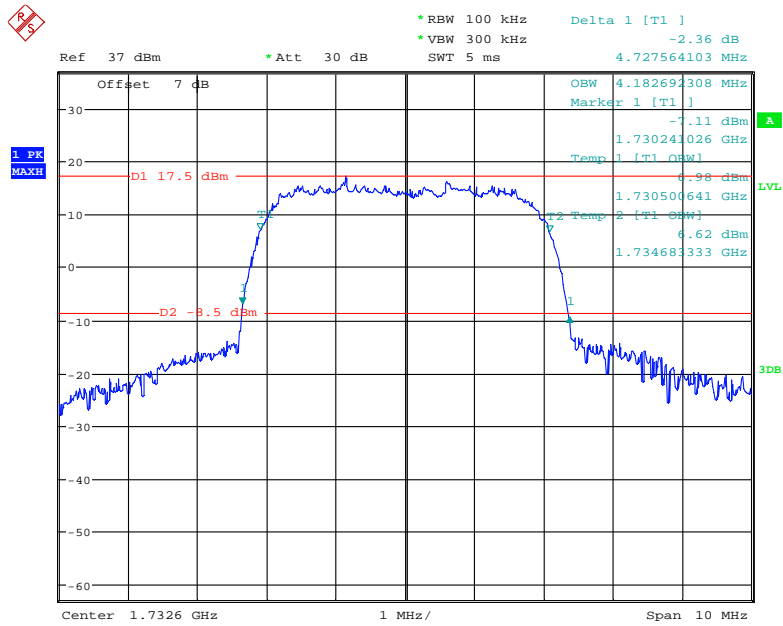
Date: 7.JUL.2021 22:32:07

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



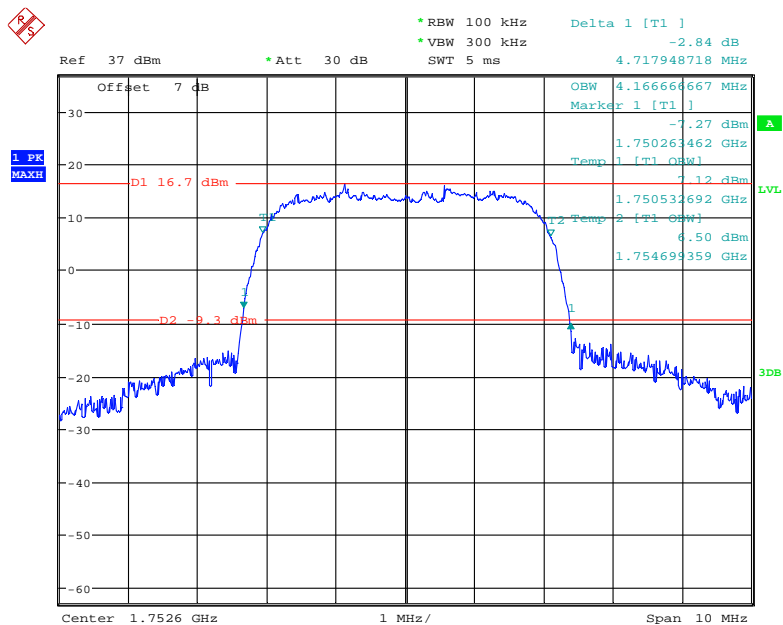
Date: 7.JUL.2021 22:57:51

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



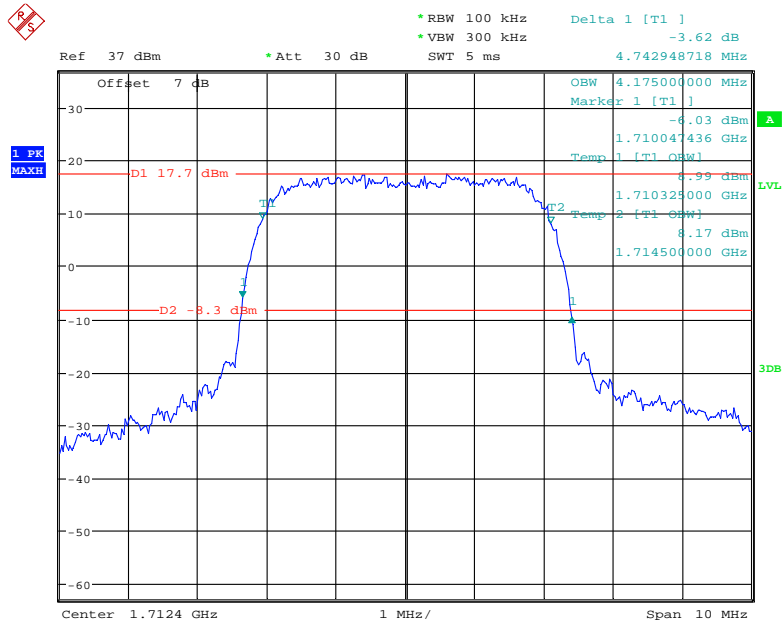
Date: 7.JUL.2021 22:57:06

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



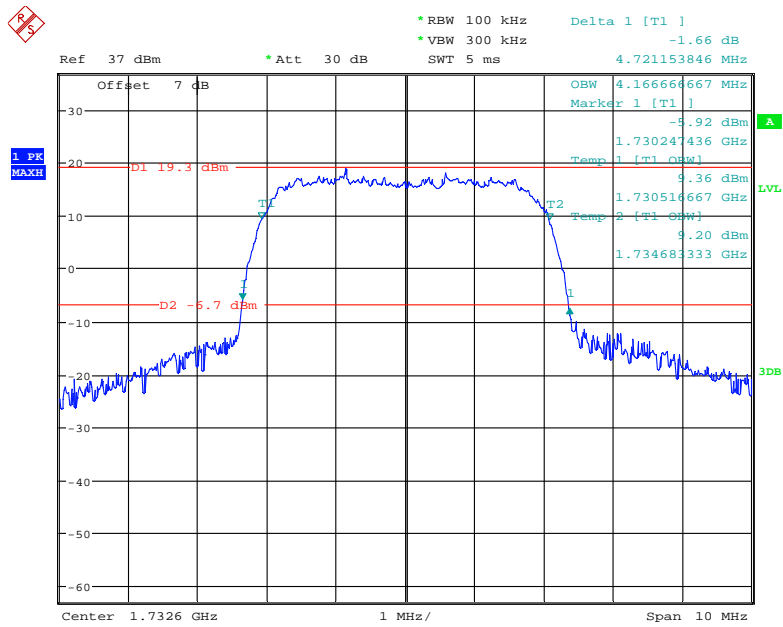
Date: 7.JUL.2021 22:53:39

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



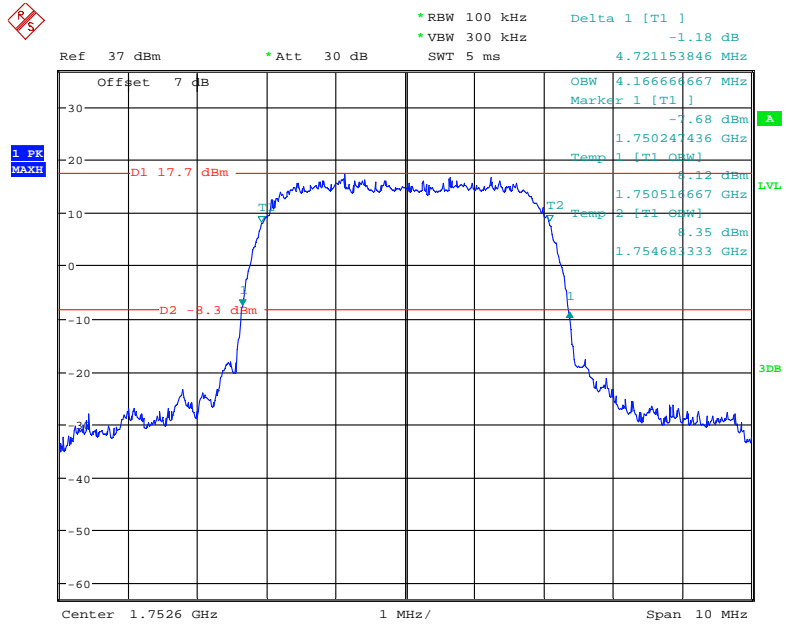
Date: 7.JUL.2021 22:38:12

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



Date: 7.JUL.2021 22:40:20

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



Date: 7.JUL.2021 22:41:12

LTE Band 2:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.110	1.296	1.104	1.314	1.104	1.302
	16QAM	1.104	1.326	1.110	1.332	1.110	1.333
3 MHz	QPSK	2.712	2.940	2.700	2.940	2.688	2.964
	16QAM	2.700	2.952	2.688	2.964	2.688	2.964
5 MHz	QPSK	4.520	5.060	4.520	5.060	4.520	5.000
	16QAM	4.520	5.000	4.540	5.020	4.520	5.060
10 MHz	QPSK	8.960	9.840	8.960	9.800	8.960	9.720
	16QAM	8.960	9.680	8.960	9.720	8.960	9.680
15 MHz	QPSK	13.560	14.880	13.500	14.820	13.500	15.000
	16QAM	13.620	15.000	13.560	14.940	13.500	14.880
20 MHz	QPSK	18.000	19.520	18.000	19.440	18.000	19.680
	16QAM	18.000	19.440	17.920	19.440	17.920	19.600

LTE Band 4:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.104	1.308	1.104	1.326	1.116	1.296
	16QAM	1.110	1.314	1.104	1.302	1.104	1.326
3 MHz	QPSK	2.688	2.940	2.688	2.952	2.688	2.964
	16QAM	2.688	2.964	2.688	2.952	2.688	2.928
5 MHz	QPSK	4.520	5.040	4.520	5.020	4.500	5.020
	16QAM	4.520	5.000	4.540	5.060	4.540	5.040
10 MHz	QPSK	8.960	9.720	8.960	9.680	8.960	9.760
	16QAM	8.960	9.640	8.960	9.680	8.960	9.760
15 MHz	QPSK	13.620	15.000	13.500	14.880	13.620	15.000
	16QAM	13.560	15.000	13.500	14.880	13.620	14.880
20 MHz	QPSK	18.000	19.440	17.920	19.440	18.000	19.600
	16QAM	18.000	19.600	18.000	19.520	18.000	19.600

LTE Band 5/LTE Band 26(Part 22H):

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.104	1.320	1.104	1.320	1.104	1.302
	16QAM	1.104	1.320	1.098	1.296	1.104	1.308
3 MHz	QPSK	2.700	2.952	2.688	2.928	2.688	2.976
	16QAM	2.700	2.976	2.688	2.940	2.688	2.940
5 MHz	QPSK	4.540	5.060	4.520	5.040	4.520	5.020
	16QAM	4.520	5.020	4.520	5.020	4.540	5.020
10 MHz	QPSK	8.960	9.720	8.960	9.680	9.000	9.800
	16QAM	8.960	9.720	8.960	9.720	8.960	9.640
15 MHz	QPSK	13.560	14.880	13.500	14.880	13.500	14.820
	16QAM	13.560	14.940	13.500	14.760	13.560	14.760

LTE Band 7:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
5 MHz	QPSK	4.540	5.060	4.520	5.020	4.520	4.980
	16QAM	4.520	5.040	4.520	5.040	4.520	5.060
10 MHz	QPSK	9.000	9.800	8.960	9.680	8.960	9.760
	16QAM	8.960	9.760	8.960	9.760	8.960	9.680
15 MHz	QPSK	13.560	14.880	13.500	15.000	13.560	14.940
	16QAM	13.560	14.940	13.560	14.880	13.560	14.880
20 MHz	QPSK	18.000	19.440	18.000	19.520	17.920	19.600
	16QAM	18.000	19.520	18.000	19.600	17.920	19.360

LTE Band 12:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.104	1.296	1.110	1.326	1.110	1.296
	16QAM	1.110	1.332	1.098	1.290	1.104	1.308
3 MHz	QPSK	2.700	2.952	2.688	2.952	2.688	2.964
	16QAM	2.688	2.976	2.688	2.964	2.688	2.952
5 MHz	QPSK	4.520	5.020	4.520	5.020	4.520	5.020
	16QAM	4.540	4.960	4.540	5.040	4.560	5.060
10 MHz	QPSK	9.000	9.840	8.960	9.720	8.960	9.800
	16QAM	8.960	9.720	8.960	9.680	8.960	9.680

LTE Band 13:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
5 MHz	QPSK	4.540	5.040	4.520	5.040	4.520	5.040
	16QAM	4.520	5.020	4.540	5.020	4.540	5.040
10 MHz	QPSK	/	/	8.960	9.800	/	/
	16QAM	/	/	8.960	9.640	/	/

LTE Band 25:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.104	1.308	1.104	1.338	1.104	1.296
	16QAM	1.104	1.326	1.104	1.314	1.104	1.302
3 MHz	QPSK	2.700	2.952	2.700	2.940	2.700	2.964
	16QAM	2.688	2.964	2.688	2.964	2.680	2.964
5 MHz	QPSK	4.540	5.060	4.520	5.020	4.520	5.020
	16QAM	4.520	5.040	4.520	5.060	4.540	5.060
10 MHz	QPSK	8.960	9.800	8.960	9.680	8.960	9.760
	16QAM	9.000	9.600	8.960	9.720	8.960	9.680
15 MHz	QPSK	13.560	15.060	13.500	14.880	13.560	14.880
	16QAM	13.560	15.000	13.500	14.880	13.500	14.880
20 MHz	QPSK	18.000	19.440	18.000	19.520	17.920	19.360
	16QAM	18.080	19.360	18.080	19.520	17.920	19.520

LTE Band 26:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.104	1.326	1.110	1.314	1.110	1.308
	16QAM	1.110	1.314	1.098	1.296	1.104	1.326
3 MHz	QPSK	2.700	2.964	2.688	2.952	2.700	2.964
	16QAM	2.700	2.928	2.688	2.952	2.688	2.964
5 MHz	QPSK	4.540	5.060	4.520	5.020	4.520	5.040
	16QAM	4.520	5.020	4.520	5.000	4.520	5.060
10 MHz	QPSK	/	/	8.960	9.800	/	/
	16QAM	/	/	8.960	9.680	/	/

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

FCC §2.1051, §22.917(a) & §24.238(a); §27.53; § 90.691 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

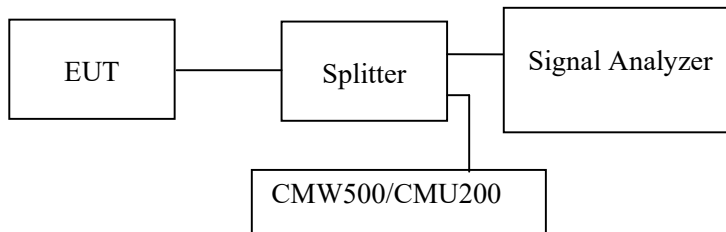
Applicable Standard

FCC §2.1051, §22.917(a) and §24.238(a), §27.53 and §90.691.

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:	26.2~28.6 °C
Relative Humidity:	52~60 %
ATM Pressure:	100.9~101.2 kPa

The testing was performed by Pedro Yun from 2021-05-14 to 2021-08-17.

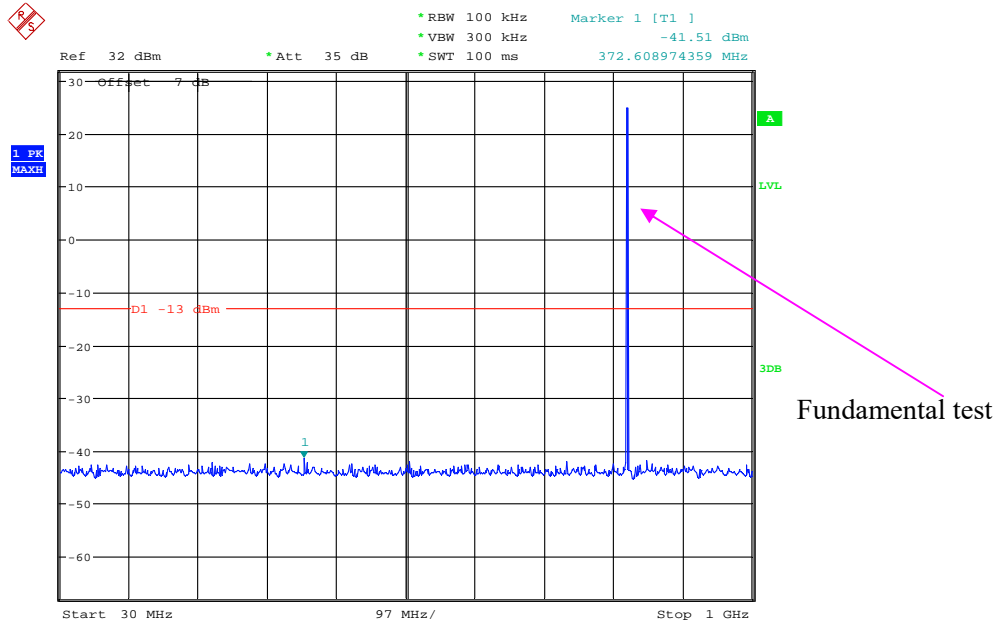
EUT operation mode: Transmitting

Test result: Pass

Please refer to the following plots.

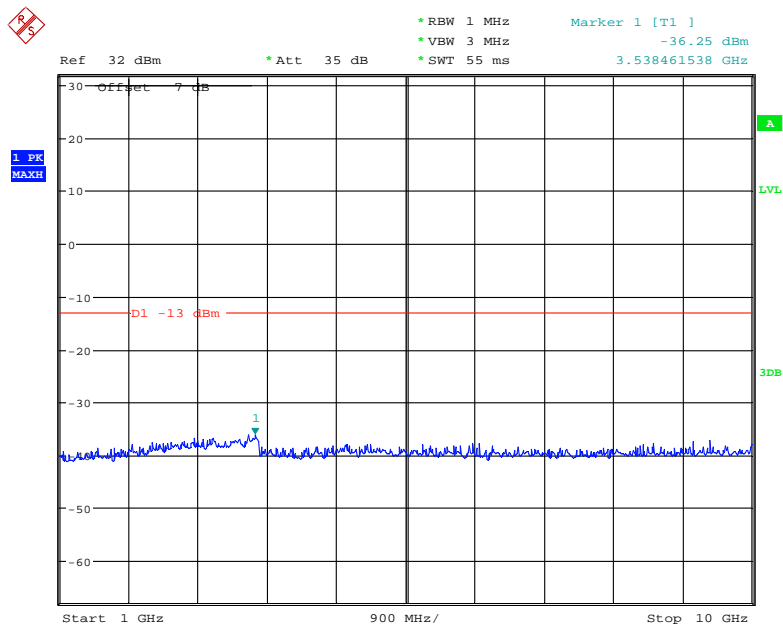
**Cellular Band (Part 22H)
Low Channel:**

30 MHz – 1 GHz (GSM Mode)



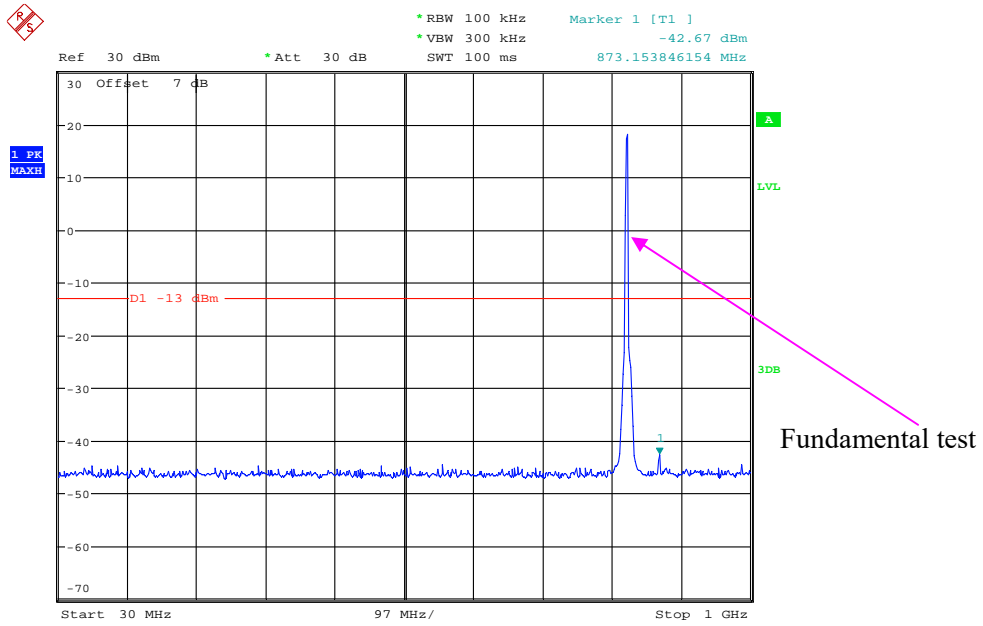
Date: 1.JUL.2021 03:01:49

1 GHz – 10 GHz (GSM Mode)



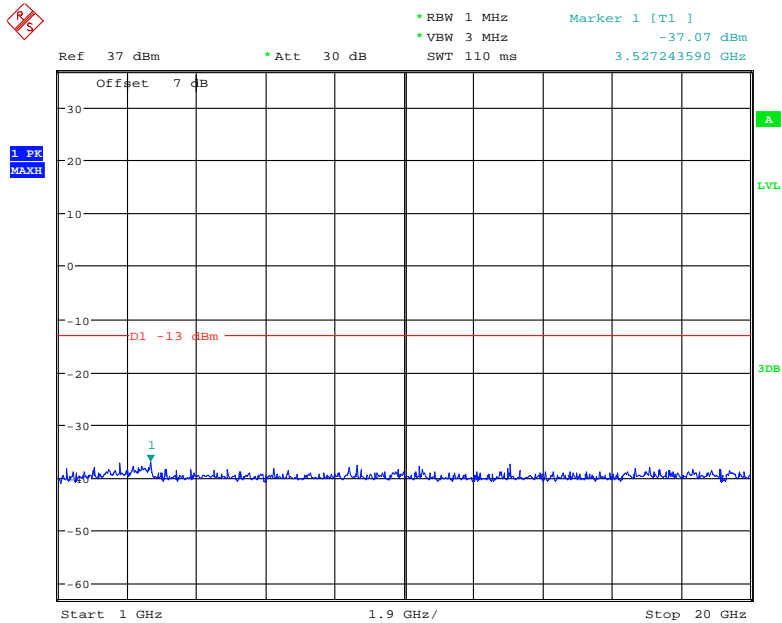
Date: 1.JUL.2021 03:08:09

30 MHz – 1 GHz (WCDMA Mode)



Date: 17.MAY.2021 23:25:00

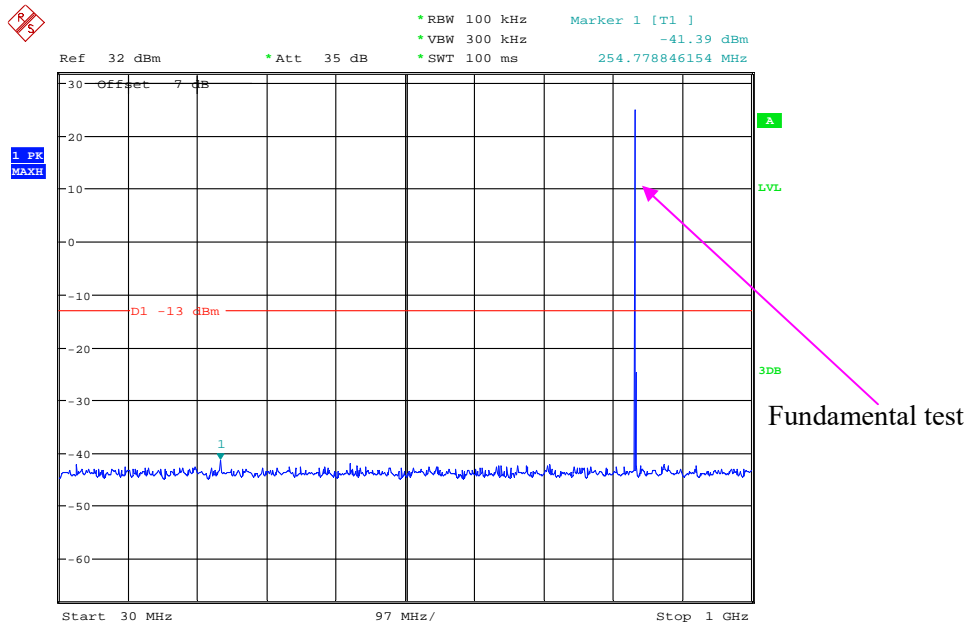
1 GHz – 20 GHz (WCDMA Mode)



Date: 7.JUL.2021 22:22:44

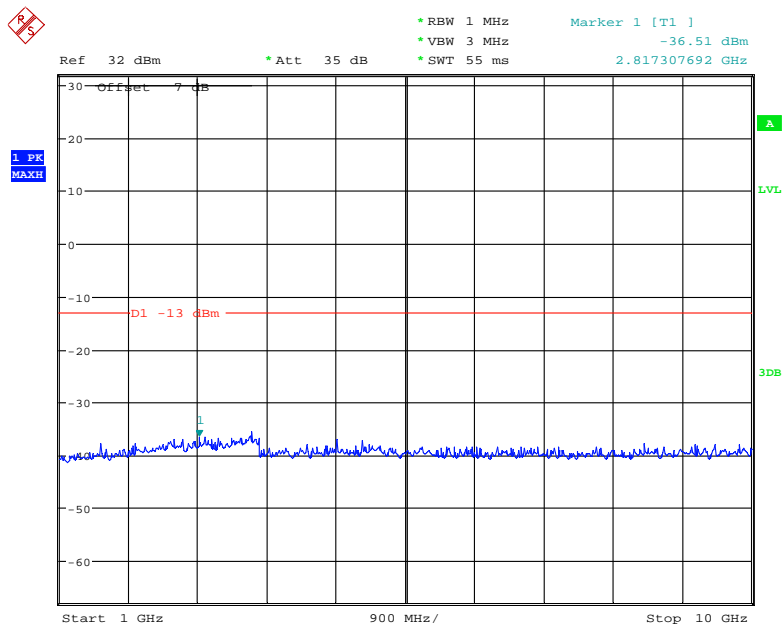
Middle Channel:

30 MHz – 1 GHz (GSM Mode)



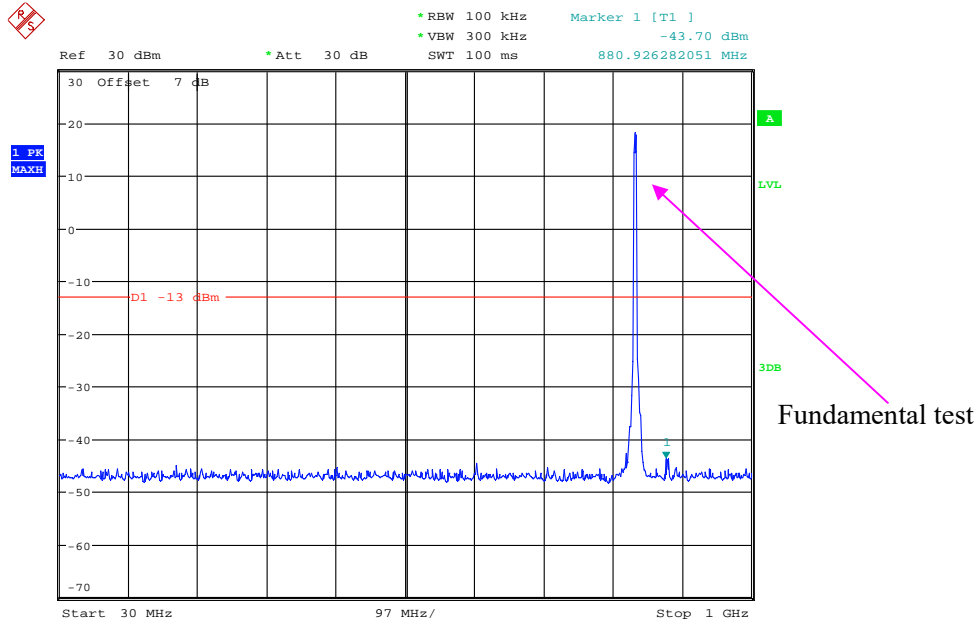
Date: 1.JUL.2021 03:04:02

1 GHz – 10 GHz (GSM Mode)



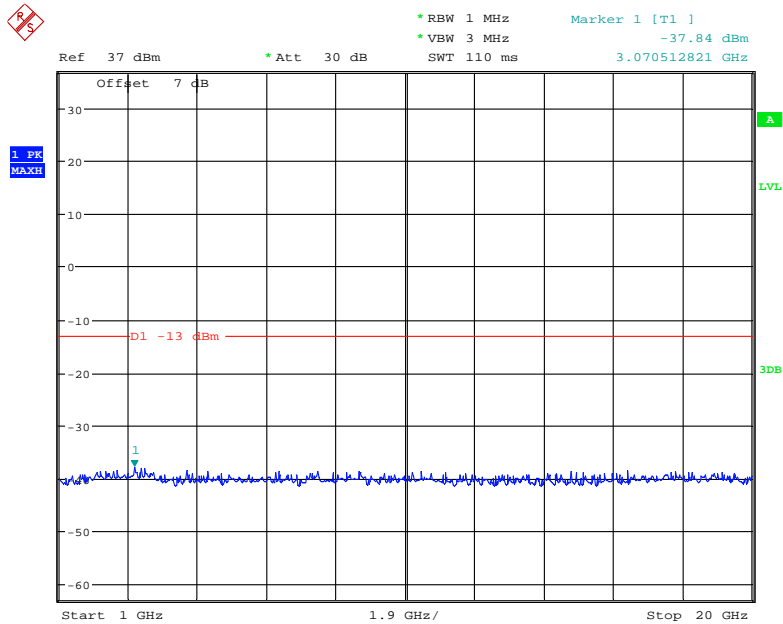
Date: 1.JUL.2021 03:06:28

30 MHz – 1 GHz (WCDMA Mode)



Date: 17.MAY.2021 23:26:26

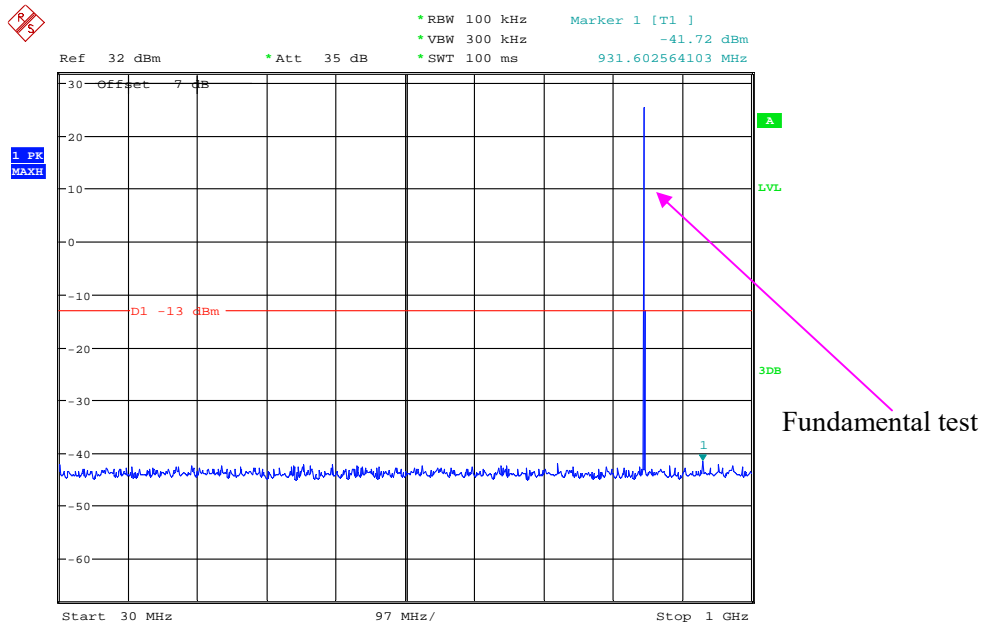
1 GHz – 20 GHz (WCDMA Mode)



Date: 7.JUL.2021 22:22:57

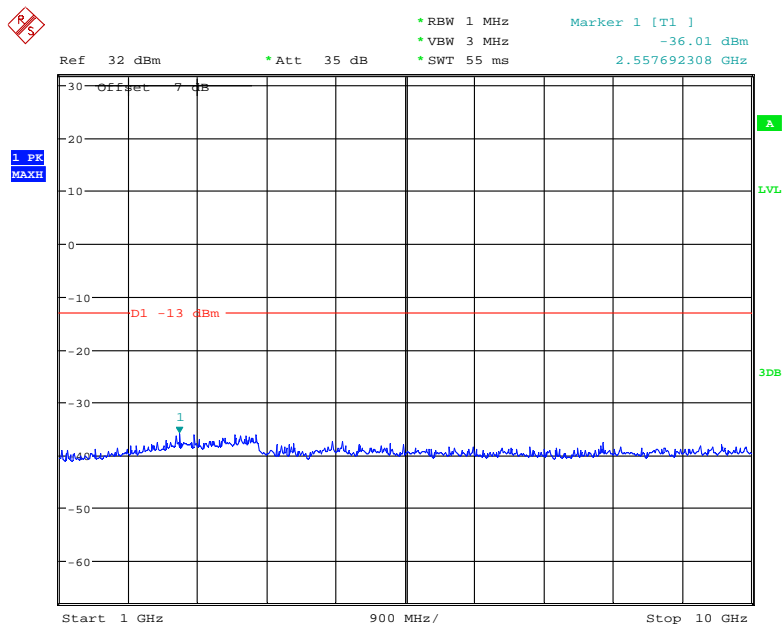
High Channel:

30 MHz – 1 GHz (GSM Mode)



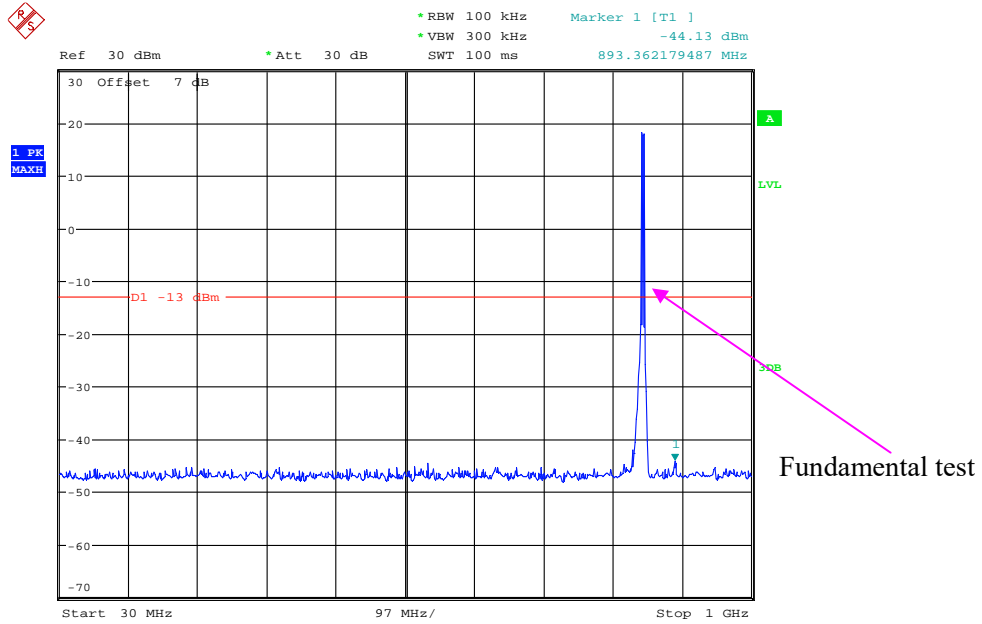
Date: 1.JUL.2021 03:04:40

1 GHz – 10 GHz (GSM Mode)



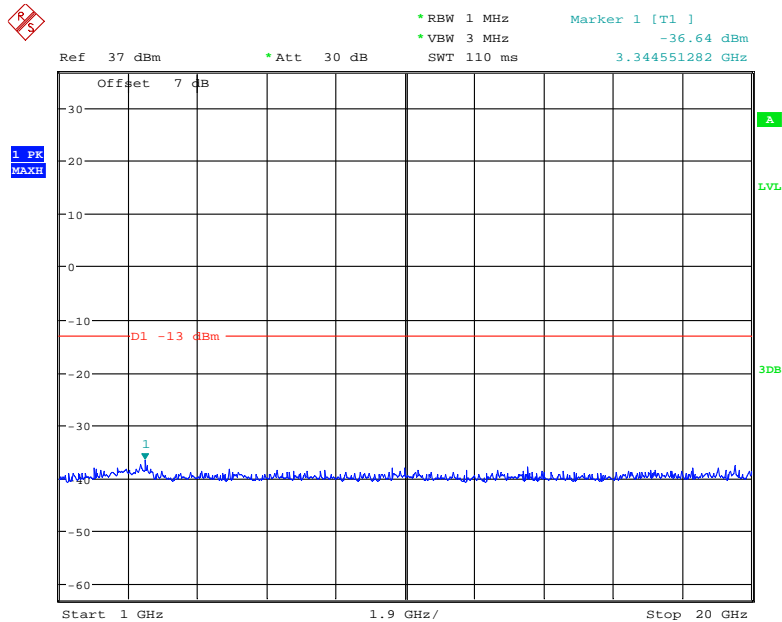
Date: 1.JUL.2021 03:05:48

30 MHz – 1 GHz (WCDMA Mode)



Date: 17.MAY.2021 23:27:14

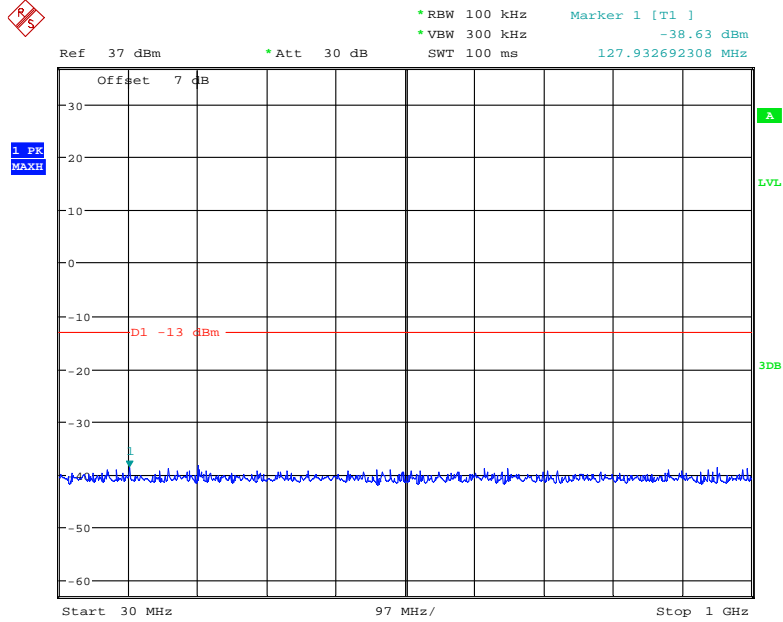
1 GHz – 20 GHz (WCDMA Mode)



Date: 7.JUL.2021 22:22:07

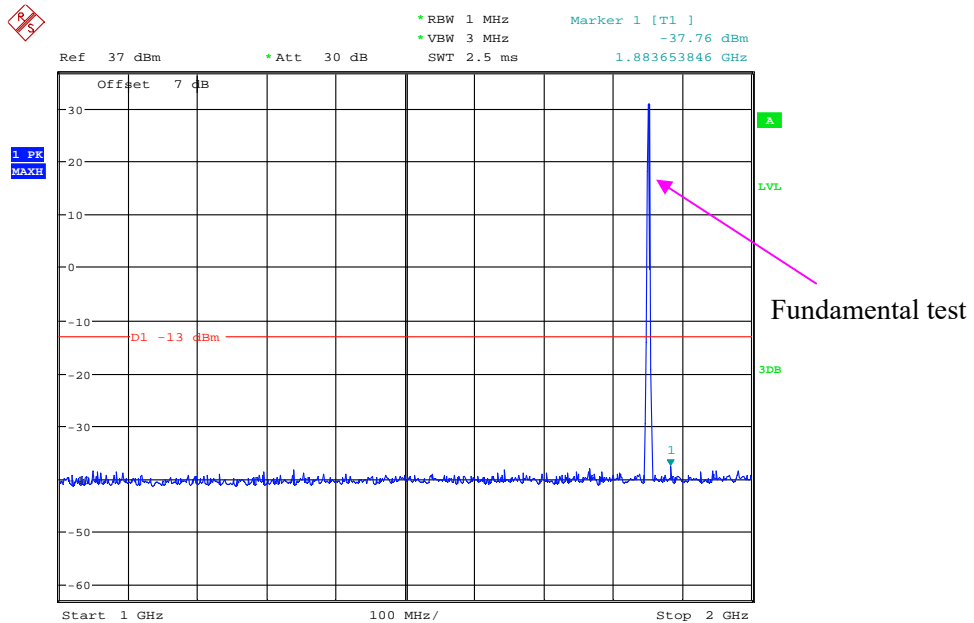
**PCS Band (Part 24E)
Low Channel:**

30 MHz – 1 GHz (GSM Mode)



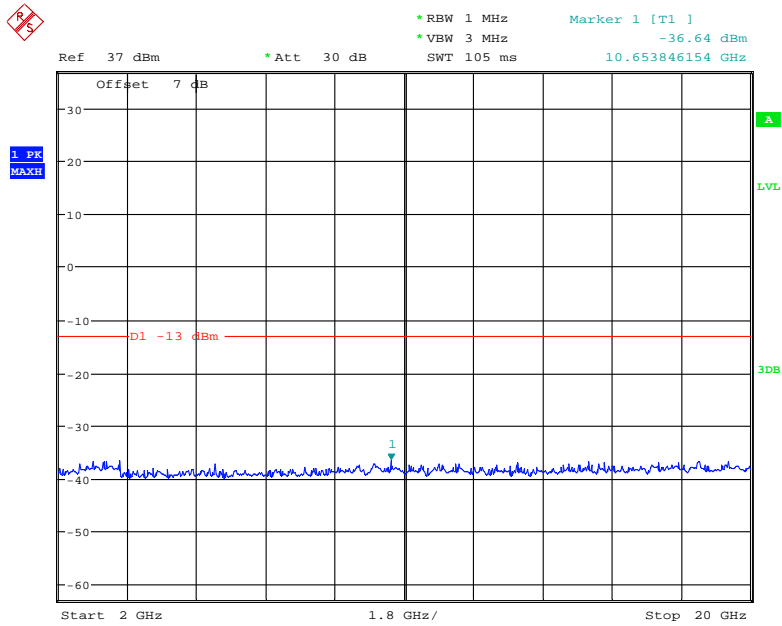
Date: 15.MAY.2021 00:39:04

1 GHz – 2 GHz (GSM Mode)



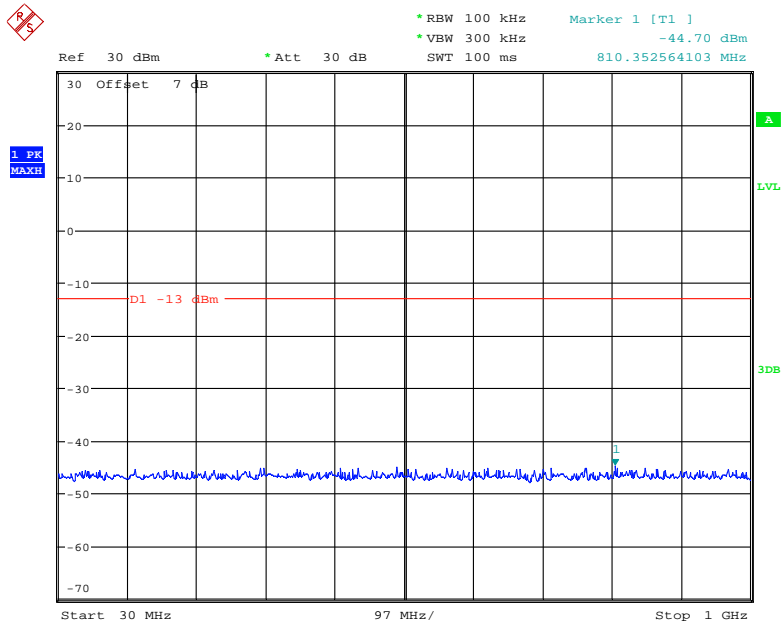
Date: 15.MAY.2021 00:38:00

2 GHz – 20 GHz (GSM Mode)



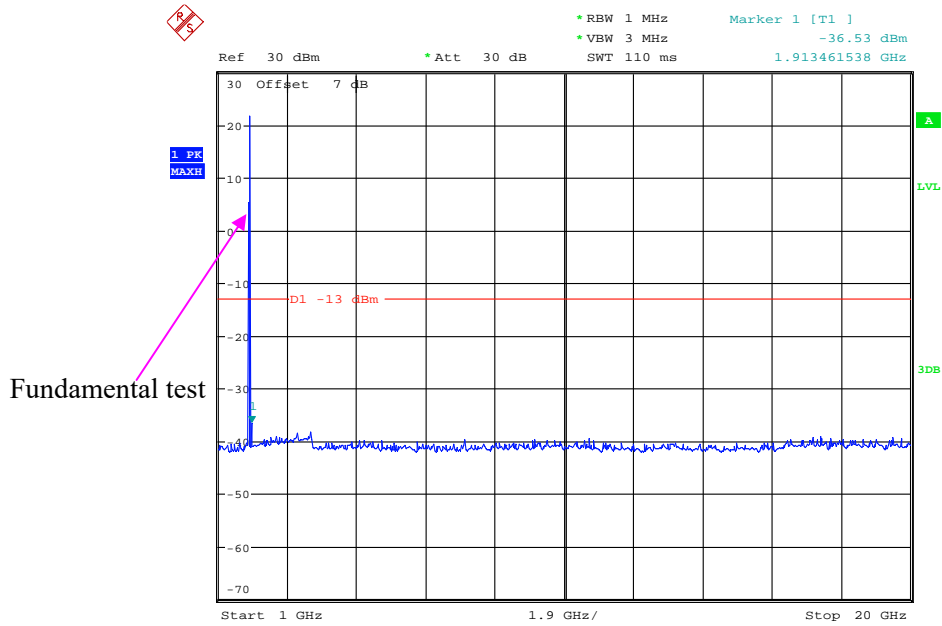
Date: 15.MAY.2021 00:34:28

30 MHz – 1 GHz (WCDMA Mode)



Date: 17.MAY.2021 23:39:45

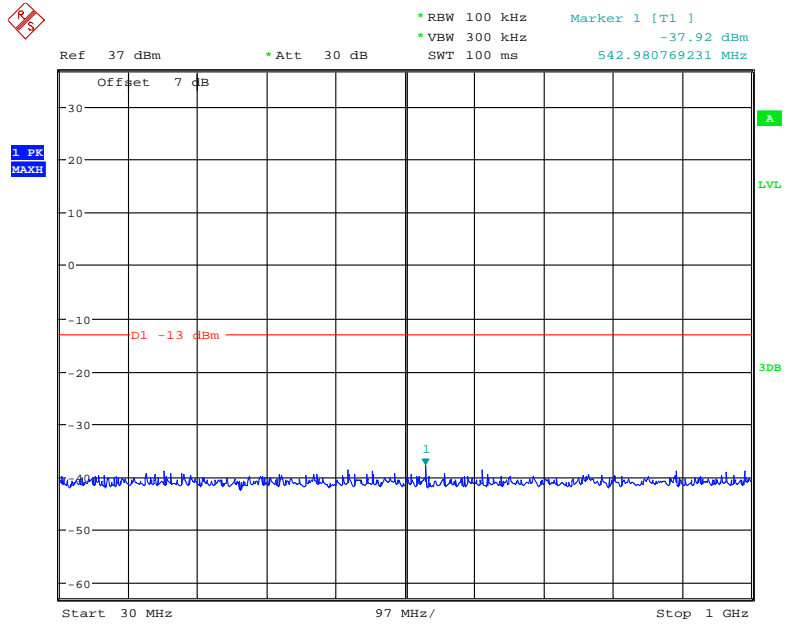
1 GHz – 20 GHz (WCDMA Mode)



Date: 17.MAY.2021 23:37:35

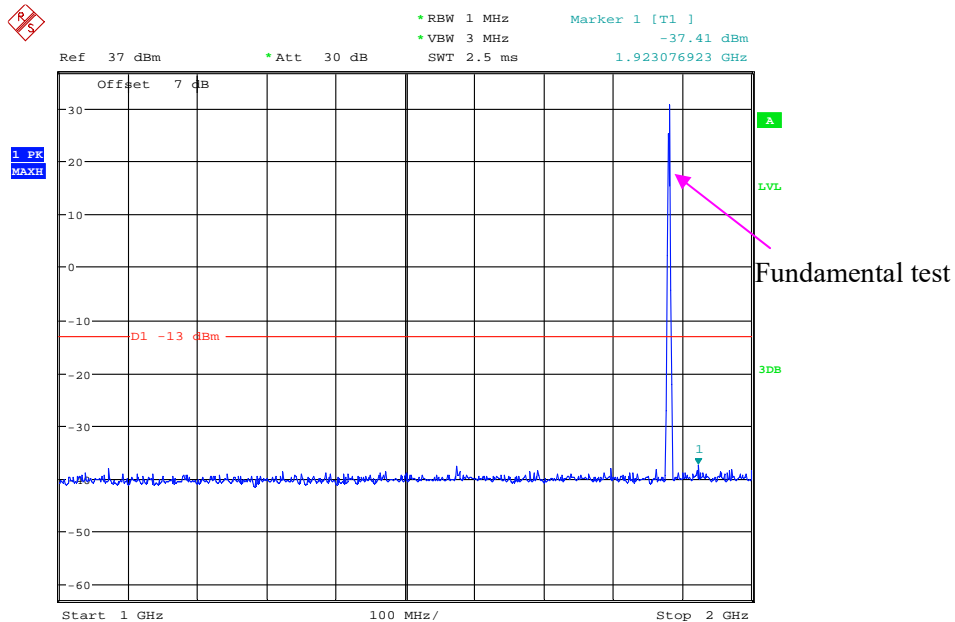
Middle Channel:

30 MHz – 1 GHz (GSM Mode)



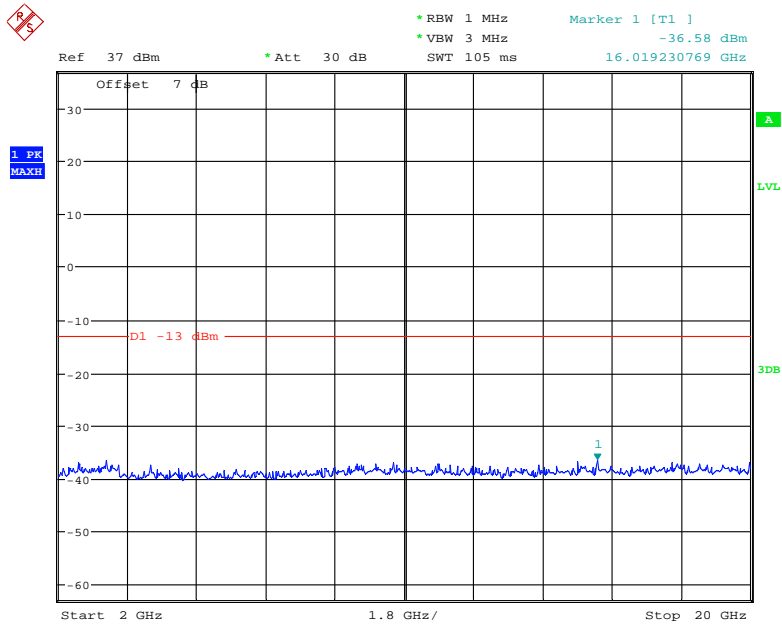
Date: 15.MAY.2021 00:39:43

1 GHz – 2 GHz (GSM Mode)



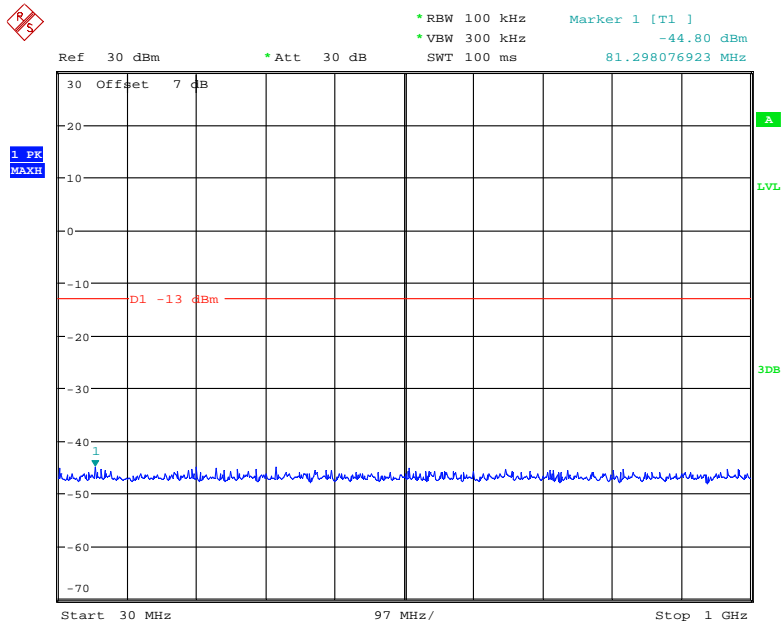
Date: 15.MAY.2021 00:37:33

2 GHz – 20 GHz (GSM Mode)



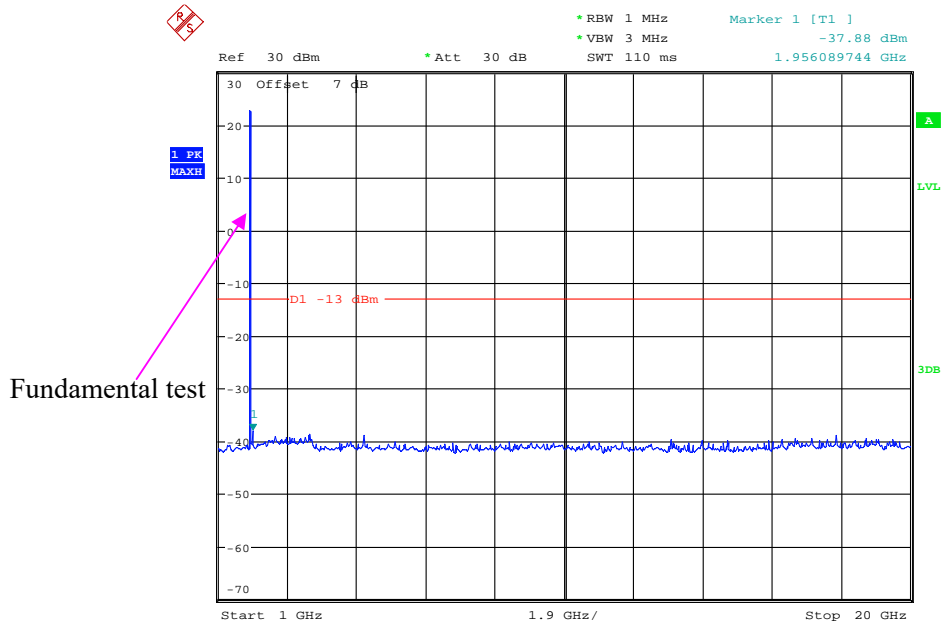
Date: 15.MAY.2021 00:35:14

30 MHz – 1 GHz (WCDMA Mode)



Date: 17.MAY.2021 23:40:39

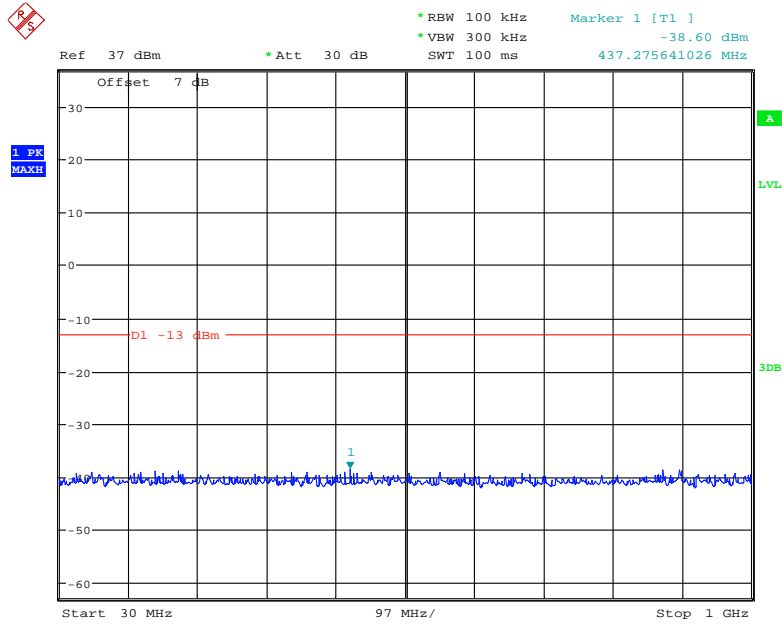
1 GHz – 20 GHz (WCDMA Mode)



Date: 17.MAY.2021 23:36:33

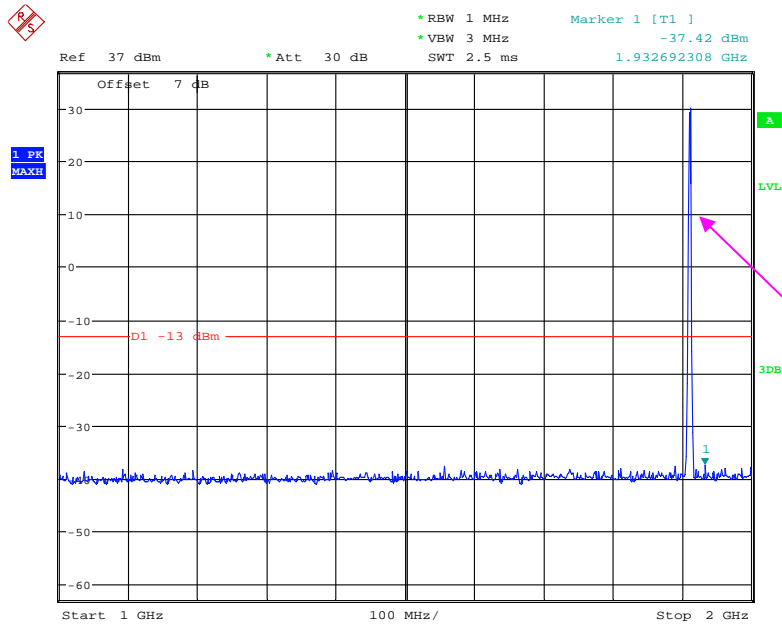
High Channel:

30 MHz – 1 GHz (GSM Mode)



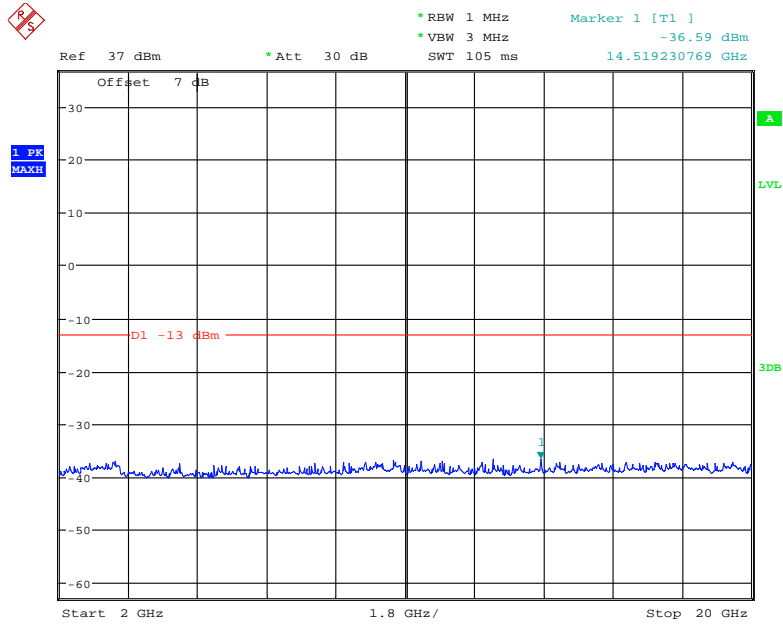
Date: 15.MAY.2021 00:40:11

1 GHz – 2 GHz (GSM Mode)



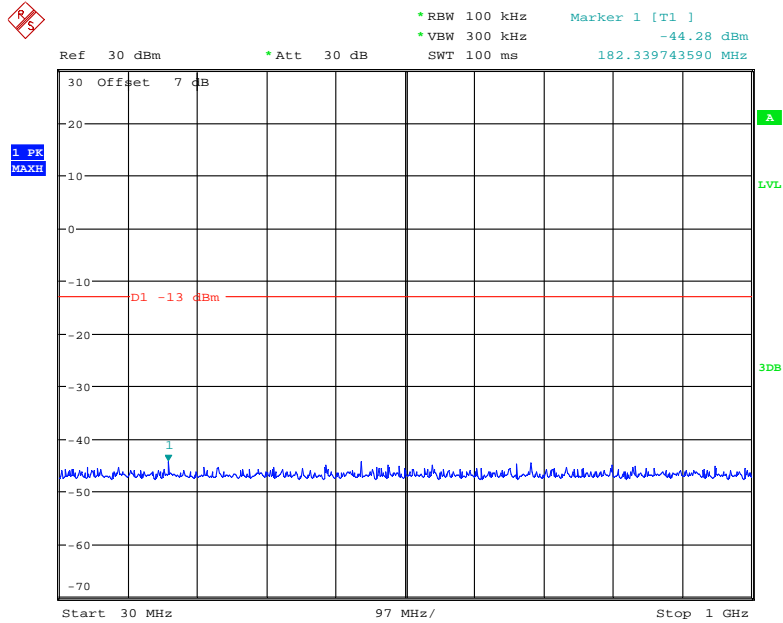
Date: 15.MAY.2021 00:36:51

2 GHz – 20 GHz (GSM Mode)



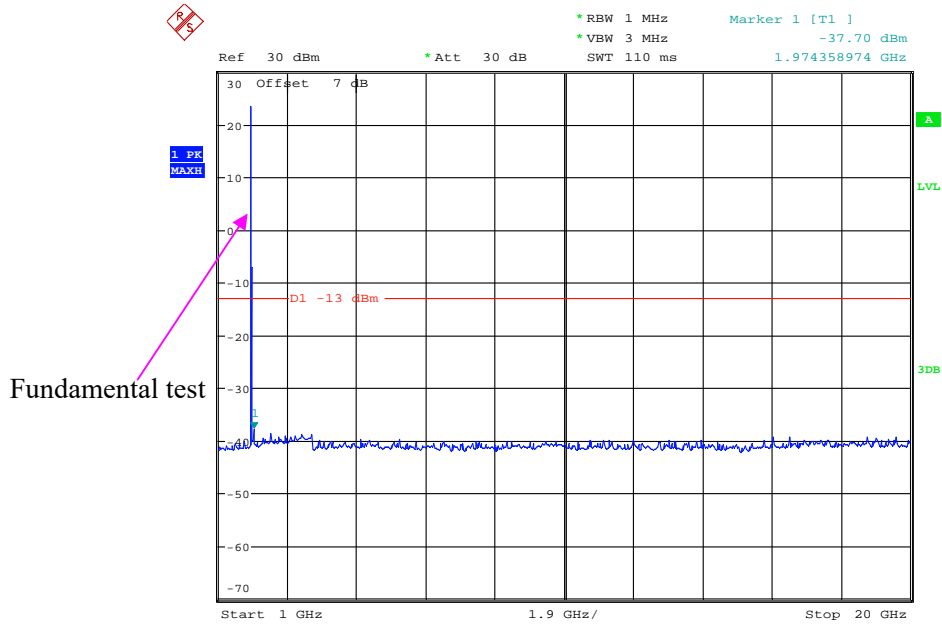
Date: 15.MAY.2021 00:35:46

30 MHz – 1 GHz (WCDMA Mode)



Date: 17.MAY.2021 23:41:26

1 GHz – 20 GHz (WCDMA Mode)

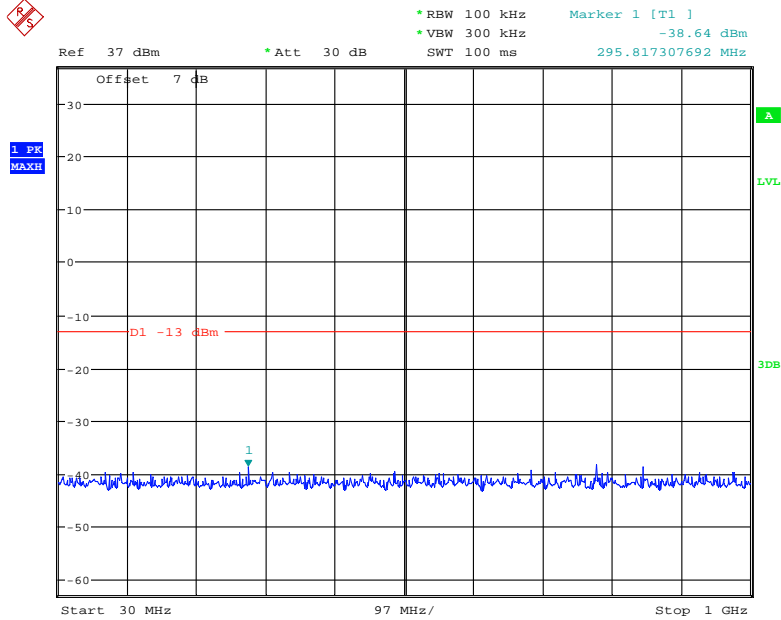


Date: 17.MAY.2021 23:34:39

AWS Band (Part 27)

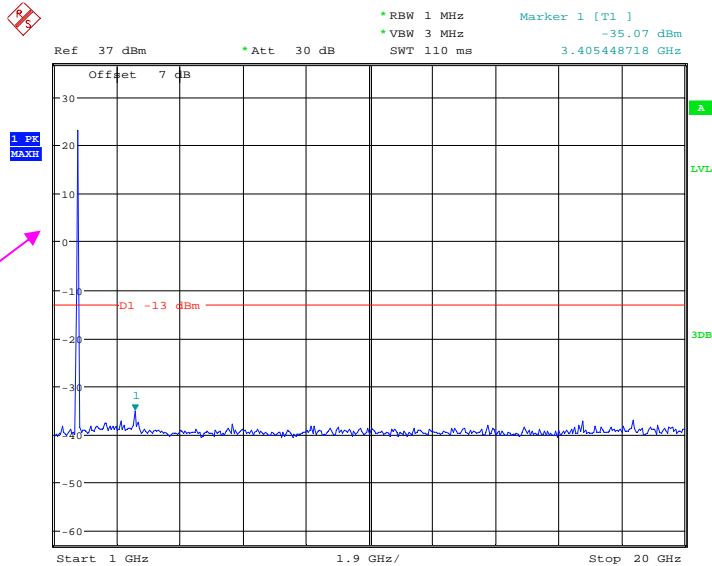
Low Channel:

30 MHz – 1 GHz (WCDMA Mode)



Date: 7.JUL.2021 22:33:23

1 GHz – 20 GHz (WCDMA Mode)

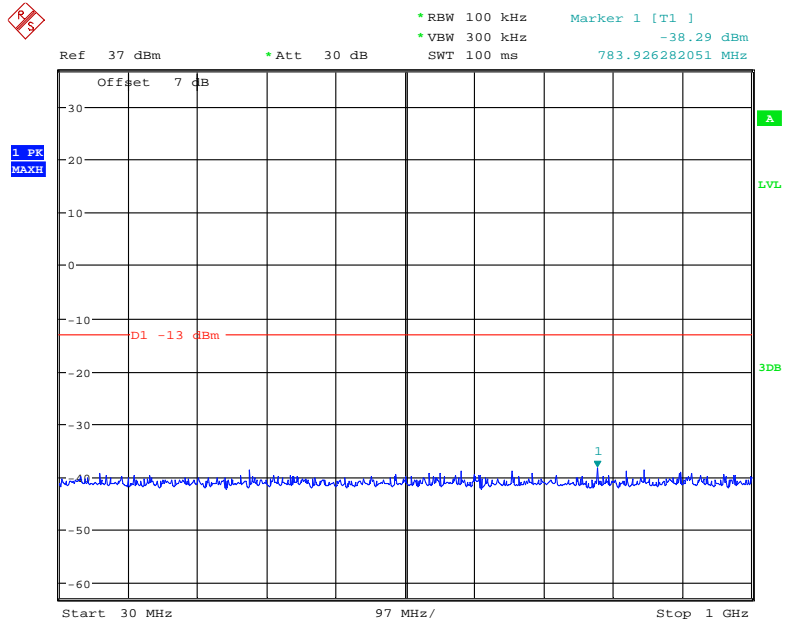


Fundamental test

Date: 7.JUL.2021 22:35:27

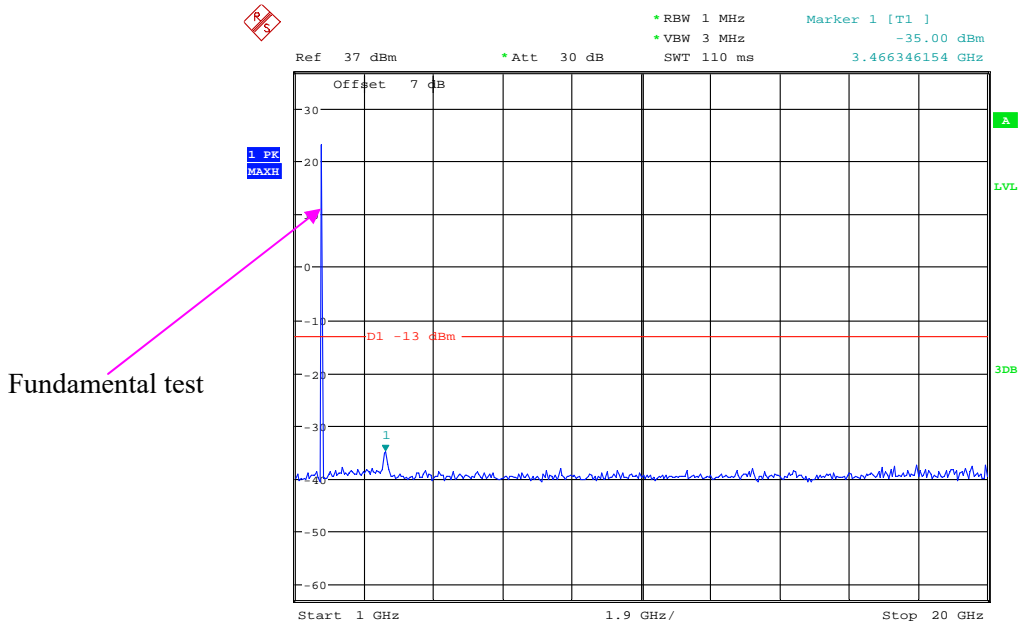
Middle Channel

30 MHz – 1 GHz (WCDMA Mode)



Date: 7.JUL.2021 22:33:33

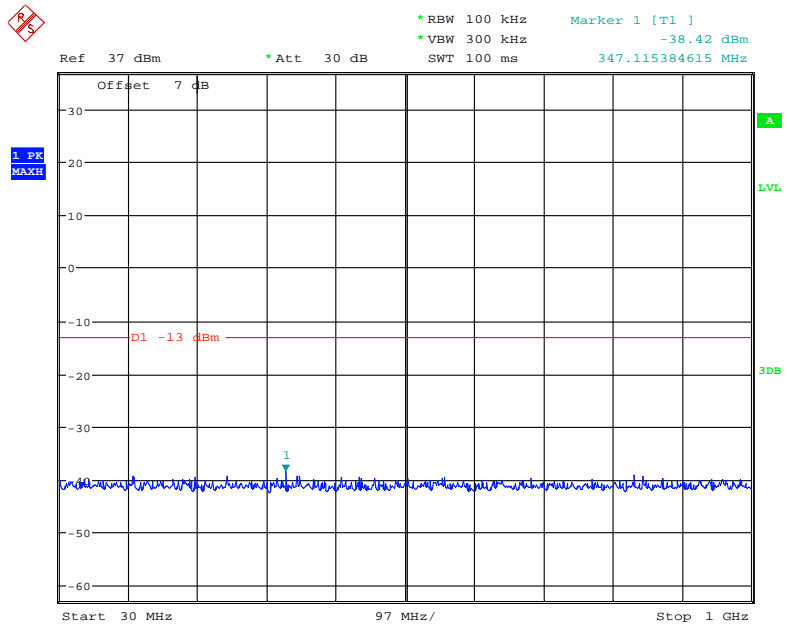
1 GHz – 20 GHz (WCDMA Mode)



Date: 7.JUL.2021 22:35:03

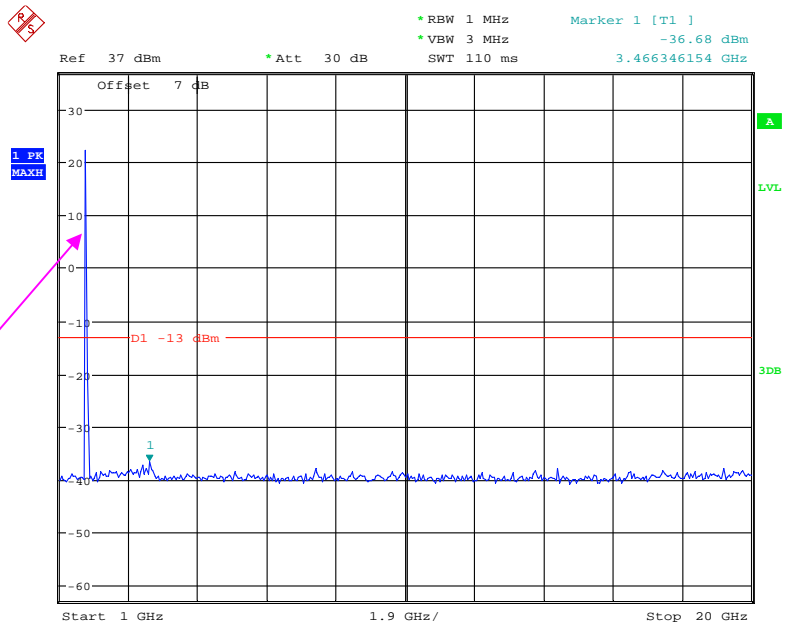
High Channel:

30 MHz – 1 GHz (WCDMA Mode)



Date: 7.JUL.2021 22:33:03

1 GHz – 20 GHz (WCDMA Mode)



Fundamental test

Date: 7.JUL.2021 22:34:31

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

FCC § 2.1053; § 22.917 (a); § 24.238 (a); §27.53; § 90.691 - SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC § 2.1053, §22.917(a), § 24.238(a), § 27.53 and §90.691.

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:	25.2~27 °C
Relative Humidity:	50~57 %
ATM Pressure:	101.0~101.1 kPa

The testing was performed by Zero Yan 2021-05-22 for below 1GHz and Bruce Lin on 2021-07-18 for above 1GHz.

EUT operation mode: Transmitting

30 MHz ~ 10 GHz:

Cellular Band

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
GSM Mode										
Low channel										
955.3	30.49	65	1.5	H	-66.0	1.36	0.0	-67.36	-13	54.36
955.3	31.64	78	2.4	V	-62.4	1.36	0.0	-63.76	-13	50.76
1648.40	69.25	169	1.5	H	-38.8	1.40	8.70	-31.50	-13	18.50
1648.40	76.25	261	2.0	V	-31.6	1.40	8.70	-24.30	-13	11.30
2472.60	64.63	329	1.1	H	-38.7	2.60	10.20	-31.10	-13	18.10
2472.60	66.59	69	1.1	V	-36.2	2.60	10.20	-28.60	-13	15.60
3296.80	48.25	349	1.7	H	-52.6	1.50	11.70	-42.40	-13	29.40
3296.80	49.85	8	2.4	V	-51.1	1.50	11.70	-40.90	-13	27.90
Middle channel										
960.6	30.62	157	1.9	H	-65.9	1.36	0.0	-67.26	-13	54.26
960.6	31.88	250	2.4	V	-62.2	1.36	0.0	-63.56	-13	50.56
1673.20	71.23	340	2.1	H	-35.1	1.30	8.90	-27.50	-13	14.50
1673.20	71.62	222	2.2	V	-34.1	1.30	8.90	-26.50	-13	13.50
2509.80	70.34	224	2.2	H	-33.0	2.60	10.20	-25.40	-13	12.40
2509.80	69.47	319	1.1	V	-33.3	2.60	10.20	-25.70	-13	12.70
3346.40	49.02	165	1.4	H	-51.9	1.50	11.70	-41.70	-13	28.70
3346.40	51.76	48	2.2	V	-49.2	1.50	11.70	-39.00	-13	26.00
High channel										
965.8	30.57	222	1.0	H	-65.9	1.36	0.0	-67.26	-13	54.26
965.8	31.77	64	2.2	V	-62.3	1.36	0.0	-63.66	-13	50.66
1697.60	70.86	30	2.1	H	-35.5	1.30	8.90	-27.90	-13	14.90
1697.60	71.83	130	1.4	V	-33.9	1.30	8.90	-26.30	-13	13.30
2546.40	65.17	276	2.1	H	-38.2	2.60	10.20	-30.60	-13	17.60
2546.40	66.76	223	1.6	V	-36.0	2.60	10.20	-28.40	-13	15.40
3395.20	50.76	319	1.5	H	-50.5	1.40	11.80	-40.10	-13	27.10
3395.20	52.71	109	1.4	V	-48.3	1.40	11.80	-37.90	-13	24.90

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
WCDMA Mode										
Low channel										
952.3	30.54	123	1.9	H	-66.0	1.36	0.0	-67.36	-13	54.36
952.3	31.64	289	1.9	V	-62.4	1.36	0.0	-63.76	-13	50.76
1652.80	45.28	208	1.9	H	-61.1	1.30	8.90	-53.50	-13	40.50
1652.80	45.17	111	1.0	V	-60.6	1.30	8.90	-53.00	-13	40.00
2479.20	45.79	247	1.8	H	-57.6	2.60	10.20	-50.00	-13	37.00
2479.20	45.93	188	1.8	V	-56.8	2.60	10.20	-49.20	-13	36.20
3305.60	43.14	303	1.7	H	-57.8	1.50	11.70	-47.60	-13	34.60
3305.60	43.26	28	1.1	V	-57.7	1.50	11.70	-47.50	-13	34.50
Middle channel										
951.6	30.64	244	2.2	H	-65.9	1.36	0.0	-67.26	-13	54.26
951.6	31.77	333	2.2	V	-62.3	1.36	0.0	-63.66	-13	50.66
1673.20	48.25	195	1.5	H	-58.1	1.30	8.90	-50.50	-13	37.50
1673.20	47.29	25	2.5	V	-58.4	1.30	8.90	-50.80	-13	37.80
2509.80	45.27	155	1.2	H	-58.1	2.60	10.20	-50.50	-13	37.50
2509.80	45.81	267	1.8	V	-56.9	2.60	10.20	-49.30	-13	36.30
3346.40	43.33	336	2.0	H	-57.6	1.50	11.70	-47.40	-13	34.40
3346.40	43.27	304	2.1	V	-57.7	1.50	11.70	-47.50	-13	34.50
High channel										
964.8	30.58	234	1.1	H	-65.9	1.36	0.0	-67.26	-13	54.26
964.8	31.68	267	2.2	V	-62.4	1.36	0.0	-63.76	-13	50.76
1693.20	45.28	18	2.0	H	-61.1	1.30	8.90	-53.50	-13	40.50
1693.20	45.55	316	1.7	V	-60.2	1.30	8.90	-52.60	-13	39.60
2539.80	44.87	220	1.9	H	-58.5	2.60	10.20	-50.90	-13	37.90
2539.80	44.59	258	1.6	V	-58.2	2.60	10.20	-50.60	-13	37.60
3386.40	43.57	157	1.5	H	-57.7	1.40	11.80	-47.30	-13	34.30
3386.40	43.24	22	1.7	V	-57.8	1.40	11.80	-47.40	-13	34.40

30 MHz ~ 20 GHz:

PCS Band

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 24E	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
GSM Mode										
Low channel										
962.1	30.46	139	2.0	H	-66.0	1.36	0.0	-67.36	-13	54.36
962.1	31.67	187	1.3	V	-62.4	1.36	0.0	-63.76	-13	50.76
3700.40	45.27	264	1.9	H	-56.5	1.60	11.90	-46.20	-13	33.20
3700.40	45.74	279	2.2	V	-55.5	1.60	11.90	-45.20	-13	32.20
Middle channel										
963.2	30.52	106	1.1	H	-66.0	1.36	0.0	-67.36	-13	54.36
963.2	31.61	171	1.8	V	-62.4	1.36	0.0	-63.76	-13	50.76
3760.00	46.04	38	1.2	H	-56.0	1.50	11.80	-45.70	-13	32.70
3760.00	45.46	282	1.6	V	-56.1	1.50	11.80	-45.80	-13	32.80
High channel										
962.5	30.53	328	1.0	H	-66.0	1.36	0.0	-67.36	-13	54.36
962.5	31.69	114	2.4	V	-62.4	1.36	0.0	-63.76	-13	50.76
3819.60	45.17	330	1.0	H	-56.9	1.50	11.80	-46.60	-13	33.60
3819.60	45.39	285	2.4	V	-56.2	1.50	11.80	-45.90	-13	32.90
WCDMA Mode										
Low channel										
962.7	30.63	80	2.1	H	-65.9	1.36	0.0	-67.26	-13	54.26
962.7	31.69	205	1.1	V	-62.4	1.36	0.0	-63.76	-13	50.76
3704.80	44.86	16	2.0	H	-56.9	1.60	11.90	-46.60	-13	33.60
3704.80	44.81	90	1.4	V	-56.4	1.60	11.90	-46.10	-13	33.10
Middle channel										
961.8	30.65	323	1.8	H	-65.9	1.36	0.0	-67.26	-13	54.26
961.8	31.55	135	1.7	V	-62.5	1.36	0.0	-63.86	-13	50.86
3760.00	44.12	198	2.4	H	-57.9	1.50	11.80	-47.60	-13	34.60
3760.00	43.25	55	1.6	V	-58.3	1.50	11.80	-48.00	-13	35.00
High channel										
961.4	30.69	18	2.4	H	-65.8	1.36	0.0	-67.16	-13	54.16
961.4	31.79	33	2.5	V	-62.3	1.36	0.0	-63.66	-13	50.66
3815.20	43.97	84	1.9	H	-58.1	1.50	11.80	-47.80	-13	34.80
3815.20	43.82	86	1.7	V	-57.8	1.50	11.80	-47.50	-13	34.50

30 MHz ~ 20 GHz:

AWS Band

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
WCDMA Mode										
Low channel										
956.8	30.49	22	2.1	H	-66.0	1.36	0.0	-67.36	-13	54.36
956.8	31.72	109	1.1	V	-62.3	1.36	0.0	-63.66	-13	50.66
3424.80	44.41	191	1.1	H	-56.4	1.40	11.80	-46.00	-13	33.00
3424.80	44.37	307	1.5	V	-56.2	1.40	11.80	-45.80	-13	32.80
Middle channel										
954.7	30.56	152	2.2	H	-65.9	1.36	0.0	-67.26	-13	54.26
954.7	31.78	14	1.7	V	-62.3	1.36	0.0	-63.66	-13	50.66
3465.20	44.58	238	2.2	H	-56.2	1.50	12.00	-45.70	-13	32.70
3465.20	44.18	95	1.1	V	-57.3	1.50	12.00	-46.80	-13	33.80
High channel										
961.2	30.51	86	1.6	H	-66.0	1.36	0.0	-67.36	-13	54.36
961.2	31.81	295	2.0	V	-62.2	1.36	0.0	-63.56	-13	50.56
3505.20	44.39	260	2.4	H	-56.4	1.50	12.00	-45.90	-13	32.90
3505.20	44.08	138	1.8	V	-57.4	1.50	12.00	-46.90	-13	33.90

LTE Band: (Pre-scan with all the bandwidth, and worst case as below)

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
Band 2										
Test frequency range: 30 MHz ~ 20 GHz										
1.4MHz, Low channel										
961.1	30.41	274	1.2	H	-66.1	1.36	0.0	-67.46	-13	54.46
961.1	31.62	68	2.5	V	-62.4	1.36	0.0	-63.76	-13	50.76
3701.40	44.01	104	2.0	H	-57.8	1.60	11.90	-47.50	-13	34.50
3701.40	44.39	242	1.1	V	-56.8	1.60	11.90	-46.50	-13	33.50
5552.10	45.33	179	1.4	H	-54.4	1.70	12.40	-43.70	-13	30.70
5552.10	48.71	225	2.0	V	-50.6	1.70	12.40	-39.90	-13	26.90
1.4MHz, Middle channel										
962.3	30.56	326	1.1	H	-65.9	1.36	0.0	-67.26	-13	54.26
962.3	31.69	257	2.0	V	-62.4	1.36	0.0	-63.76	-13	50.76
3760.00	43.85	51	1.7	H	-58.2	1.50	11.80	-47.90	-13	34.90
3760.00	44.42	25	2.5	V	-57.2	1.50	11.80	-46.90	-13	33.90
5640.00	46.27	102	1.0	H	-53.4	1.70	12.40	-42.70	-13	29.70
5640.00	48.59	316	2.3	V	-50.8	1.70	12.40	-40.10	-13	27.10
1.4MHz, High channel										
959.8	30.61	217	1.2	H	-65.9	1.36	0.0	-67.26	-13	54.26
959.8	31.72	28	1.5	V	-62.3	1.36	0.0	-63.66	-13	50.66
3818.60	43.59	114	1.4	H	-58.5	1.50	11.80	-48.20	-13	35.20
3818.60	44.67	265	1.2	V	-56.9	1.50	11.80	-46.60	-13	33.60
5727.90	47.3	80	2.3	H	-52.6	1.60	12.10	-42.10	-13	29.10
5727.90	48.99	316	1.7	V	-50.3	1.60	12.10	-39.80	-13	26.80
Band 4										
Test frequency range:30 MHz ~ 20 GHz										
1.4MHz, Low channel										
963.1	30.42	118	1.5	H	-66.1	1.36	0.0	-67.46	-13	54.46
963.1	31.71	129	2.3	V	-62.3	1.36	0.0	-63.66	-13	50.66
3421.40	48.06	110	1.7	H	-52.7	1.40	11.80	-42.30	-13	29.30
3421.40	47.24	256	1.3	V	-53.4	1.40	11.80	-43.00	-13	30.00
1.4MHz, Middle channel										
958.6	30.46	302	1.1	H	-66.0	1.36	0.0	-67.36	-13	54.36
958.6	31.68	58	1.4	V	-62.4	1.36	0.0	-63.76	-13	50.76
3465.00	48.06	244	1.1	H	-52.7	1.50	12.00	-42.20	-13	29.20
3465.00	47.24	109	1.1	V	-54.3	1.50	12.00	-43.80	-13	30.80
1.4MHz, High channel										
959.7	30.37	326	1.7	H	-66.1	1.36	0.0	-67.46	-13	54.46
959.7	31.63	210	1.3	V	-62.4	1.36	0.0	-63.76	-13	50.76
3508.60	48.27	60	1.1	H	-52.5	1.50	12.00	-42.00	-13	29.00
3508.60	47.84	96	1.3	V	-53.7	1.50	12.00	-43.20	-13	30.20

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
Band 5/Band 26(Part 22H)										
Test frequency range:30 MHz ~ 10 GHz										
1.4MHz, Low channel										
956.8	30.43	183	2.1	H	-66.1	1.36	0.0	-67.46	-13	54.46
956.8	31.65	10	1.1	V	-62.4	1.36	0.0	-63.76	-13	50.76
1649.40	67.55	238	1.9	H	-40.5	1.40	8.70	-33.20	-13	20.20
1649.40	65.42	206	1.4	V	-42.4	1.40	8.70	-35.10	-13	22.10
2474.10	60.14	82	1.2	H	-43.2	2.60	10.20	-35.60	-13	22.60
2474.10	62.47	29	1.1	V	-40.3	2.60	10.20	-32.70	-13	19.70
3298.80	44.56	264	1.0	H	-56.3	1.50	11.70	-46.10	-13	33.10
3298.80	44.72	137	1.4	V	-56.2	1.50	11.70	-46.00	-13	33.00
1.4MHz, Middle channel										
964.7	30.59	77	1.7	H	-65.9	1.36	0.0	-67.26	-13	54.26
964.7	31.56	134	1.6	V	-62.5	1.36	0.0	-63.86	-13	50.86
1673.00	68.18	309	2.0	H	-38.2	1.30	8.90	-30.60	-13	17.60
1673.00	67.58	93	1.1	V	-38.2	1.30	8.90	-30.60	-13	17.60
2509.50	63.80	89	1.7	H	-39.6	2.60	10.20	-32.00	-13	19.00
2509.50	62.17	12	1.3	V	-40.6	2.60	10.20	-33.00	-13	20.00
3346.00	43.27	99	2.4	H	-57.6	1.50	11.70	-47.40	-13	34.40
3346.00	43.71	164	2.1	V	-57.2	1.50	11.70	-47.00	-13	34.00
1.4MHz, High channel										
961.2	30.56	268	1.3	H	-65.9	1.36	0.0	-67.26	-13	54.26
961.2	31.74	334	2.4	V	-62.3	1.36	0.0	-63.66	-13	50.66
1696.60	60.55	220	1.3	H	-45.8	1.30	8.90	-38.20	-13	25.20
1696.60	60.70	304	1.3	V	-45.0	1.30	8.90	-37.40	-13	24.40
2544.90	65.04	155	1.1	H	-38.3	2.60	10.20	-30.70	-13	17.70
2544.90	64.95	208	1.5	V	-37.8	2.60	10.20	-30.20	-13	17.20
3393.20	44.16	265	2.2	H	-57.1	1.40	11.80	-46.70	-13	33.70
3393.20	44.52	43	1.3	V	-56.5	1.40	11.80	-46.10	-13	33.10
Band 7										
Test frequency range: 30 MHz ~ 26.5 GHz										
5MHz, Low channel										
957.3	30.49	189	2.3	H	-66.0	1.36	0.0	-67.36	-25	42.36
957.3	31.52	62	1.2	V	-62.5	1.36	0.0	-63.86	-25	38.86
5005.00	49.86	161	2.2	H	-50.7	1.70	12.00	-40.40	-25	15.40
5005.00	48.67	255	2.4	V	-51.4	1.70	12.00	-41.10	-25	16.10
5MHz, Middle channel										
957.6	30.57	335	1.1	H	-65.9	1.36	0.0	-67.26	-25	42.26
951.6	31.56	28	1.5	V	-62.5	1.36	0.0	-63.86	-25	38.86
5070.00	49.24	187	2.1	H	-50.8	1.60	12.10	-40.30	-25	15.30
5070.00	47.96	169	2.1	V	-52.1	1.60	12.10	-41.60	-25	16.60
5MHz, High channel										
958.8	30.47	354	2.3	H	-66.0	1.36	0.0	-67.36	-25	42.36
958.8	31.58	173	2.5	V	-62.5	1.36	0.0	-63.86	-25	38.86
5135.00	50.32	279	1.0	H	-49.7	1.60	12.10	-39.20	-25	14.20
5135.00	49.11	48	2.4	V	-50.9	1.60	12.10	-40.40	-25	15.40

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
Band 12										
Test frequency range: 30 MHz ~10 GHz										
1.4MHz, Low channel										
962.5	30.50	360	1.6	H	-66.0	1.36	0.0	-67.36	-13	54.36
962.5	31.60	38	1.6	V	-62.5	1.36	0.0	-63.86	-13	50.86
1399.40	51.79	243	2.3	H	-56.4	1.60	7.90	-50.10	-13	37.10
1399.40	46.99	91	1.0	V	-61.4	1.60	7.90	-55.10	-13	42.10
2099.10	45.31	255	1.6	H	-55.8	1.30	9.70	-47.40	-13	34.40
2099.10	45.89	258	1.5	V	-56.1	1.30	9.70	-47.70	-13	34.70
2798.80	44.02	315	1.8	H	-59.9	1.80	10.50	-51.20	-13	38.20
2798.80	43.27	145	2.0	V	-60.3	1.80	10.50	-51.60	-13	38.60
3498.50	48.11	188	2.4	H	-52.8	1.50	12.00	-42.30	-13	29.30
3498.50	47.32	60	2.0	V	-54.3	1.50	12.00	-43.80	-13	30.80
1.4MHz, Middle channel										
961.7	30.49	195	1.4	H	-66.0	1.36	0.0	-67.36	-13	54.36
961.7	31.70	250	1.1	V	-62.4	1.36	0.0	-63.76	-13	50.76
1415.00	52.16	179	2.4	H	-56.0	1.60	7.90	-49.70	-13	36.70
1415.00	48.46	95	2.2	V	-60.0	1.60	7.90	-53.70	-13	40.70
2122.50	44.57	86	1.3	H	-56.6	1.30	9.70	-48.20	-13	35.20
2122.50	45.93	18	2.4	V	-56.0	1.30	9.70	-47.60	-13	34.60
2830.00	44.27	68	2.0	H	-59.7	1.80	10.50	-51.00	-13	38.00
2830.00	43.85	244	1.6	V	-59.8	1.80	10.50	-51.10	-13	38.10
3537.50	47.19	184	1.7	H	-53.7	1.50	12.00	-43.20	-13	30.20
3537.50	46.78	151	1.3	V	-54.9	1.50	12.00	-44.40	-13	31.40
1.4MHz, High channel										
963.6	30.59	239	2.1	H	-65.9	1.36	0.0	-67.26	-13	54.26
963.6	31.76	108	1.1	V	-62.3	1.36	0.0	-63.66	-13	50.66
1430.60	53.01	217	2.5	H	-55.2	1.60	7.90	-48.90	-13	35.90
1430.60	49.33	48	1.1	V	-59.1	1.60	7.90	-52.80	-13	39.80
2145.90	44.79	146	1.6	H	-56.3	1.30	9.70	-47.90	-13	34.90
2145.90	46.10	324	2.3	V	-55.9	1.30	9.70	-47.50	-13	34.50
2861.20	44.19	258	2.4	H	-60.5	1.70	10.70	-51.50	-13	38.50
2861.20	43.76	68	1.6	V	-61.0	1.70	10.70	-52.00	-13	39.00
3576.50	46.11	216	1.1	H	-55.6	1.50	12.10	-45.00	-13	32.00
3576.50	45.09	66	1.1	V	-56.1	1.50	12.10	-45.50	-13	32.50

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
Band 13										
Test frequency range: 30 MHz ~ 10GHz										
5MHz, Low channel										
962.3	30.69	202	1.0	H	-65.8	1.36	0.0	-67.16	-13	54.16
962.3	31.65	119	1.2	V	-62.4	1.36	0.0	-63.76	-13	50.76
1559.00	58.55	43	1.1	H	-49.5	1.40	8.70	-42.20	-40	2.20
1559.00	57.48	70	1.6	V	-50.4	1.40	8.70	-43.10	-40	3.10
2338.50	64.07	196	1.3	H	-41.2	1.30	10.00	-32.50	-13	19.50
2338.50	59.61	211	1.1	V	-45.5	1.30	10.00	-36.80	-13	23.80
3118.00	44.25	62	2.5	H	-57.3	1.70	11.30	-47.70	-13	34.70
3118.00	44.08	302	1.4	V	-57.4	1.70	11.30	-47.80	-13	34.80
5MHz, Middle channel										
959.3	30.52	18	1.8	H	-66.0	1.36	0.0	-67.36	-13	54.36
959.3	31.67	303	1.5	V	-62.4	1.36	0.0	-63.76	-13	50.76
1564.00	58.70	175	1.9	H	-49.4	1.40	8.70	-42.10	-40	2.10
1564.00	57.25	153	1.9	V	-50.6	1.40	8.70	-43.30	-40	3.30
2346.00	60.88	316	2.2	H	-44.4	1.30	10.00	-35.70	-13	22.70
2346.00	59.25	140	1.9	V	-45.9	1.30	10.00	-37.20	-13	24.20
3128.00	44.49	162	1.0	H	-57.1	1.70	11.30	-47.50	-13	34.50
3128.00	44.38	221	1.6	V	-57.1	1.70	11.30	-47.50	-13	34.50
5MHz, High channel										
960.1	30.42	60	1.3	H	-66.1	1.36	0.0	-67.46	-13	54.46
960.1	31.75	100	2.1	V	-62.3	1.36	0.0	-63.66	-13	50.66
1569.00	58.25	105	2.0	H	-49.8	1.40	8.70	-42.50	-40	2.50
1569.00	57.51	206	1.4	V	-50.3	1.40	8.70	-43.00	-40	3.00
2353.50	63.71	230	2.3	H	-40.6	2.30	10.10	-32.80	-13	19.80
2353.50	58.76	118	1.2	V	-44.6	2.30	10.10	-36.80	-13	23.80
3138.00	44.28	137	1.9	H	-57.3	1.70	11.30	-47.70	-13	34.70
3138.00	44.39	173	1.0	V	-57.1	1.70	11.30	-47.50	-13	34.50

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
Band 25										
Test frequency range: 30 MHz ~ 20GHz										
1.4MHz, Low channel										
959.1	30.67	344	2.1	H	-65.8	1.36	0.0	-67.16	-13	54.16
959.1	31.78	224	1.9	V	-62.3	1.36	0.0	-63.66	-13	50.66
3701.40	50.14	237	1.3	H	-51.9	1.60	11.90	-41.60	-13	28.60
3701.40	49.77	129	1.4	V	-51.7	1.60	11.90	-41.40	-13	28.40
1.4MHz, Middle channel										
960.6	30.45	22	2.3	H	-66.1	1.36	0.0	-67.46	-13	54.46
960.6	31.70	157	2.1	V	-62.4	1.36	0.0	-63.76	-13	50.76
3765.00	45.84	67	2.3	H	-56.6	1.50	11.80	-46.30	-13	33.30
3765.00	45.77	293	1.6	V	-56.2	1.50	11.80	-45.90	-13	32.90
1.4MHz, High channel										
965.8	30.22	50	1.8	H	-66.3	1.36	0.0	-67.66	-13	54.66
965.8	31.76	169	2.3	V	-62.3	1.36	0.0	-63.66	-13	50.66
3828.60	45.58	79	1.9	H	-56.8	1.50	11.80	-46.50	-13	33.50
3828.60	46.15	106	1.3	V	-55.8	1.50	11.80	-45.50	-13	32.50

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
Band 26(Part 90S)										
Test frequency range: 30 MHz ~ 10GHz										
1.4MHz, Low channel										
963.2	30.26	22	1.8	H	-66.2	1.36	0.0	-67.56	-13	54.56
963.2	31.74	184	1.5	V	-62.3	1.36	0.0	-63.66	-13	50.66
1629.40	64.28	224	1.1	H	-43.8	1.40	8.70	-36.50	-13	23.50
1629.40	63.17	222	2.5	V	-44.7	1.40	8.70	-37.40	-13	24.40
2444.10	54.91	252	2.4	H	-49.4	2.30	10.10	-41.60	-13	28.60
2444.10	53.97	252	2.2	V	-49.4	2.30	10.10	-41.60	-13	28.60
1.4MHz, Middle channel										
962.1	30.36	12	1.7	H	-66.1	1.36	0.0	-67.46	-13	54.46
962.1	31.69	63	1.8	V	-62.4	1.36	0.0	-63.76	-13	50.76
1638.00	64.34	186	2.0	H	-43.7	1.40	8.70	-36.40	-13	23.40
1638.00	63.27	275	1.9	V	-44.6	1.40	8.70	-37.30	-13	24.30
2457.00	57.68	213	2.0	H	-45.7	2.60	10.20	-38.10	-13	25.10
2457.00	58.34	270	2.0	V	-44.4	2.60	10.20	-36.80	-13	23.80
1.4MHz, High channel										
963.5	30.47	169	1.7	H	-66.0	1.36	0.0	-67.36	-13	54.36
963.5	31.62	311	1.7	V	-62.4	1.36	0.0	-63.76	-13	50.76
1646.60	64.58	167	2.2	H	-43.5	1.40	8.70	-36.20	-13	23.20
1646.60	63.87	316	1.9	V	-44.0	1.40	8.70	-36.70	-13	23.70
2469.90	54.26	248	1.6	H	-49.1	2.60	10.20	-41.50	-13	28.50
2469.90	55.31	209	2.0	V	-47.4	2.60	10.20	-39.80	-13	26.80

Note:
 Absolute Level = Substituted Level - Cable loss + Antenna Gain
 Margin = Limit- Absolute Level
 dBd is for the ERP, dBi is for EIRP.

FCC § 22.917 (a); § 24.238 (a); §27.53(c) (h)(m); § 90.691 - 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)(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.

According to § 90.691, (a) Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

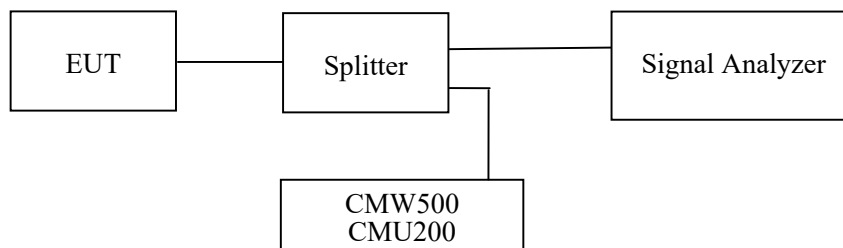
(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section

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:	26.2~28.6 °C
Relative Humidity:	52~60 %
ATM Pressure:	100.9~101.2 kPa

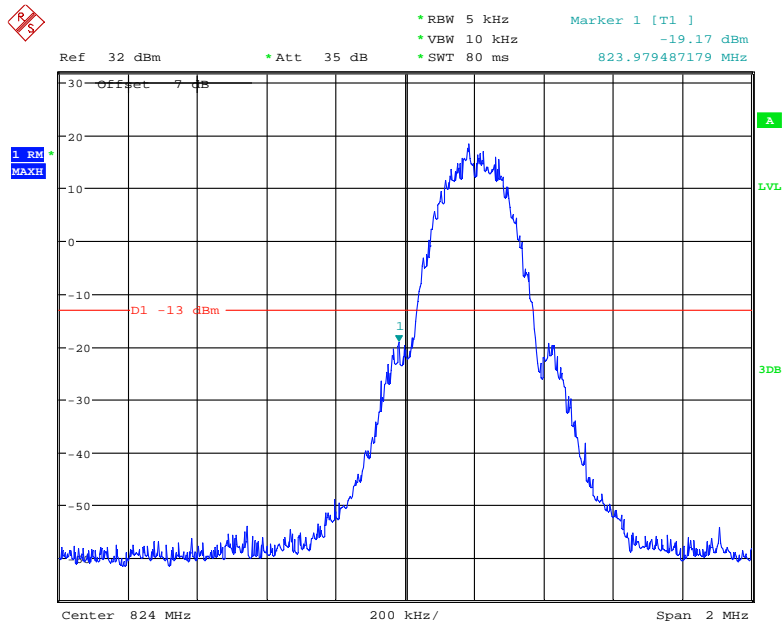
The testing was performed by Pedro Yun from 2021-05-14 to 2021-08-17.

EUT operation mode: Transmitting (Worst case)

Test Result: Pass

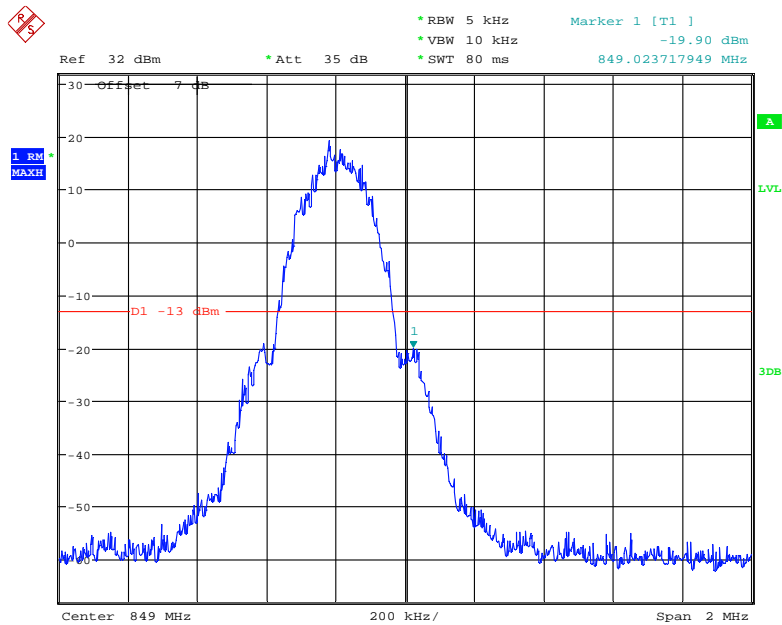
Please refer to the following plots.

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



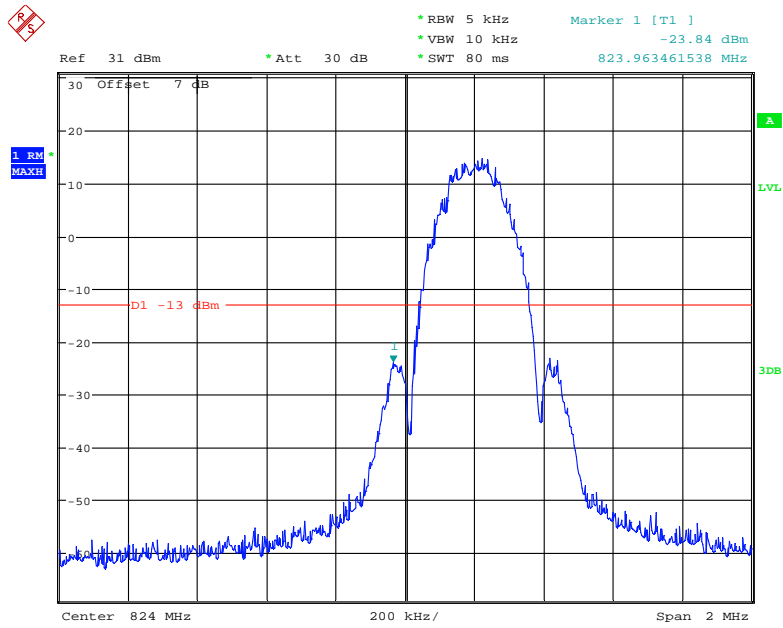
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Cellular Band, Right Band Edge for GSM (GMSK) Mode



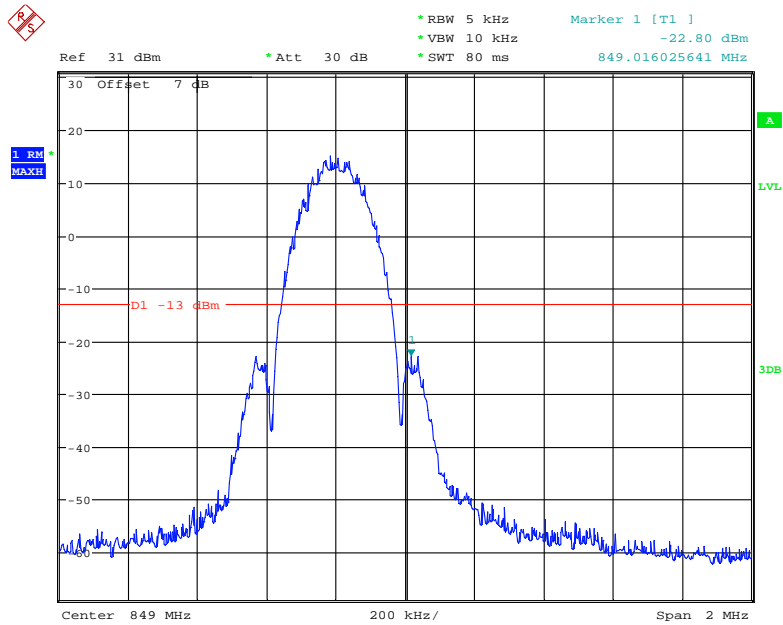
Date: 1.JUL.2021 02:53:01

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



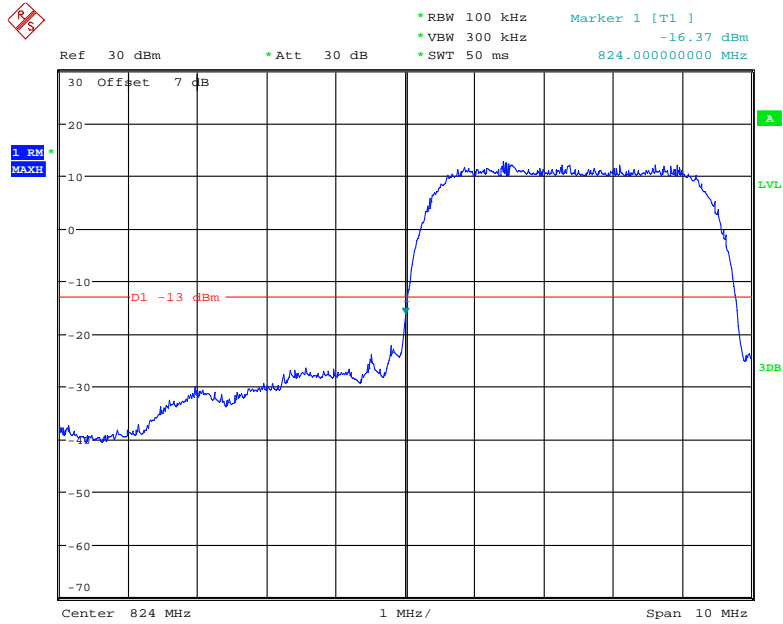
Date: 1.JUL.2021 01:56:57

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



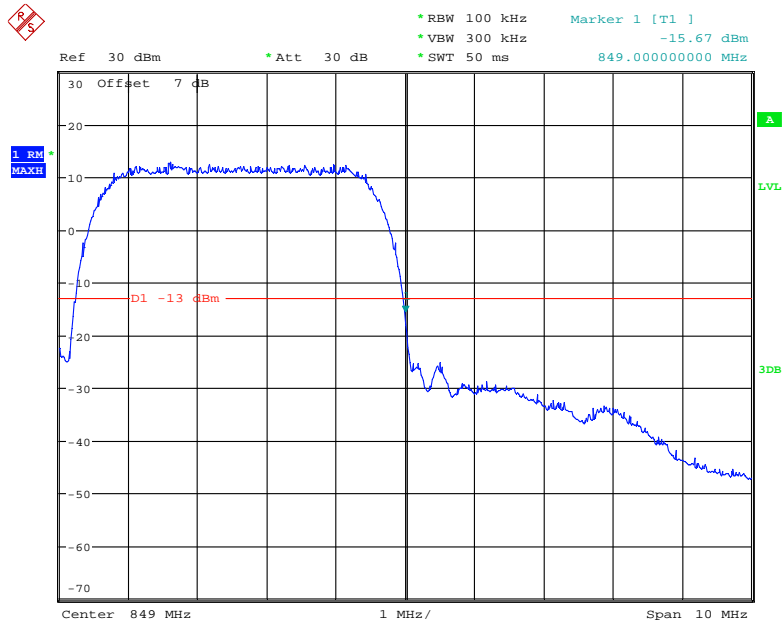
Date: 1.JUL.2021 01:55:48

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



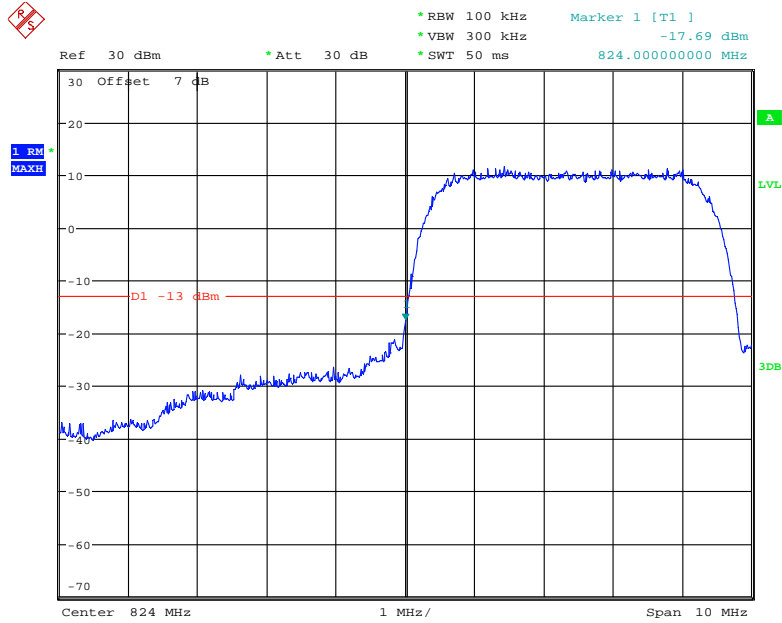
Date: 7.JUL.2021 22:25:48

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



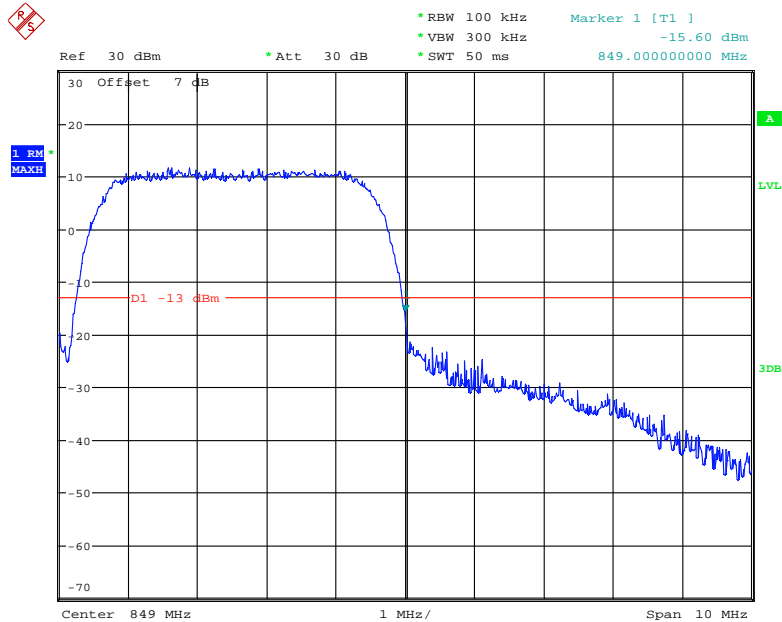
Date: 7.JUL.2021 22:25:01

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



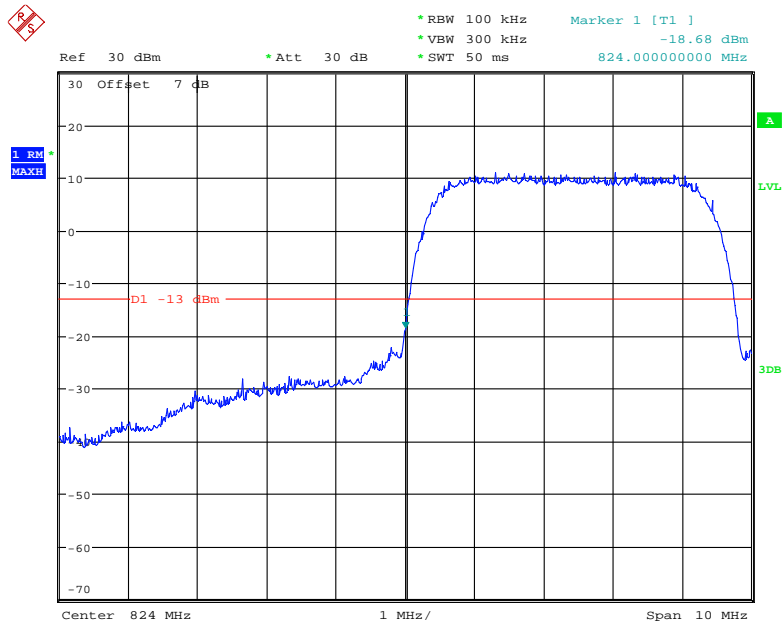
Date: 7.JUL.2021 22:45:05

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



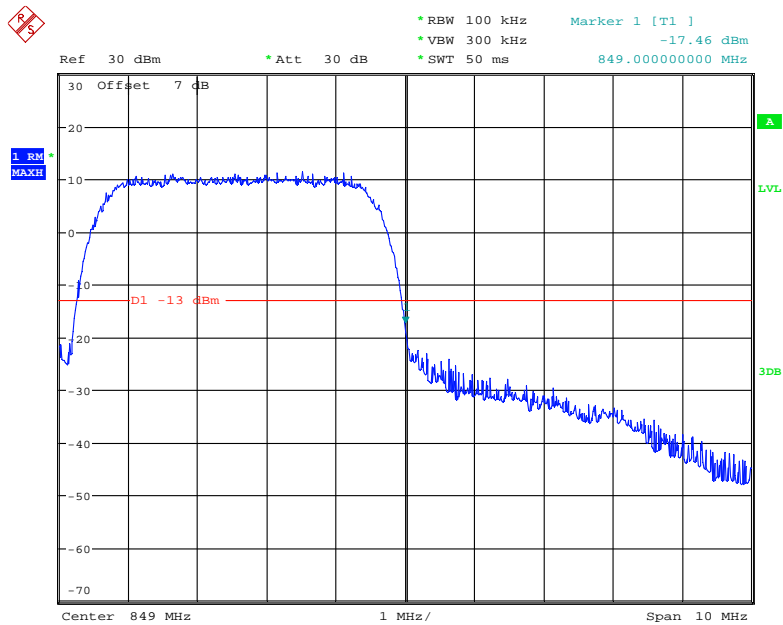
Date: 7.JUL.2021 22:45:34

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



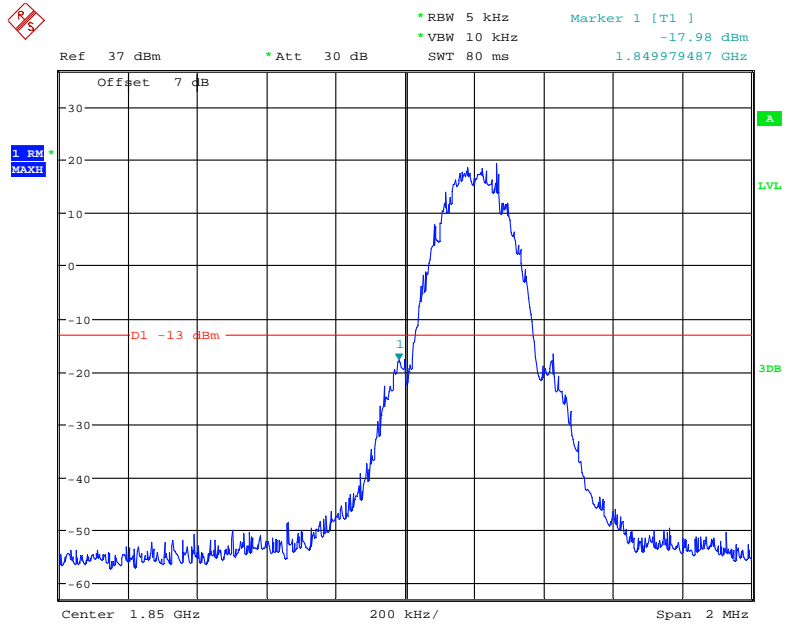
Date: 7.JUL.2021 22:47:45

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



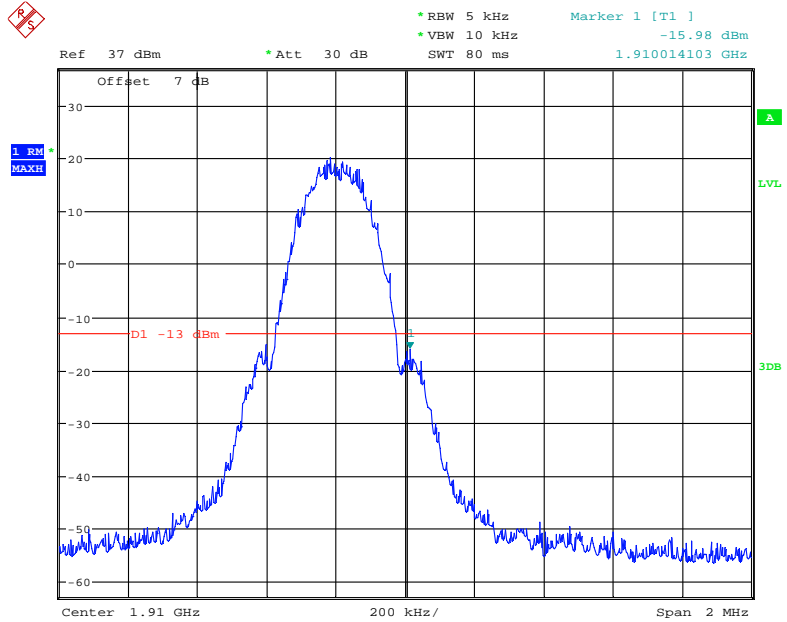
Date: 7.JUL.2021 22:47:18

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



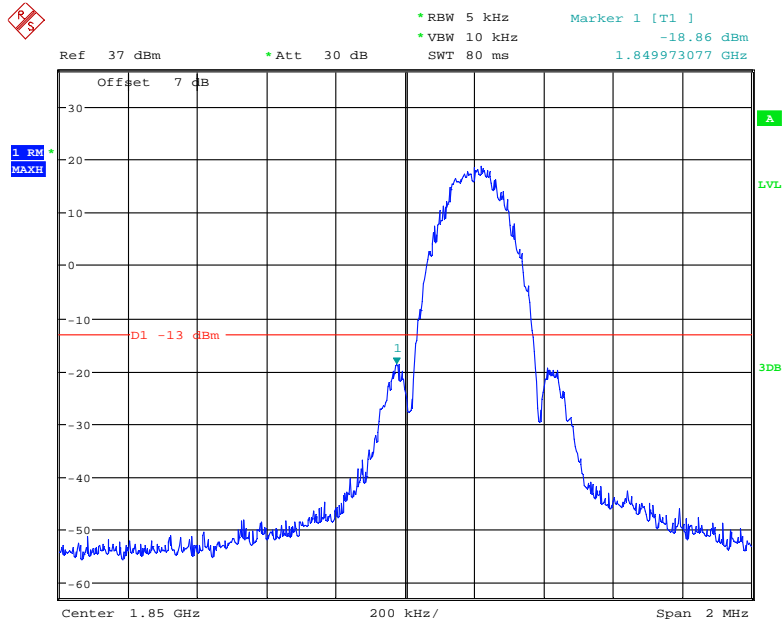
Date: 22.MAY.2021 00:52:24

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



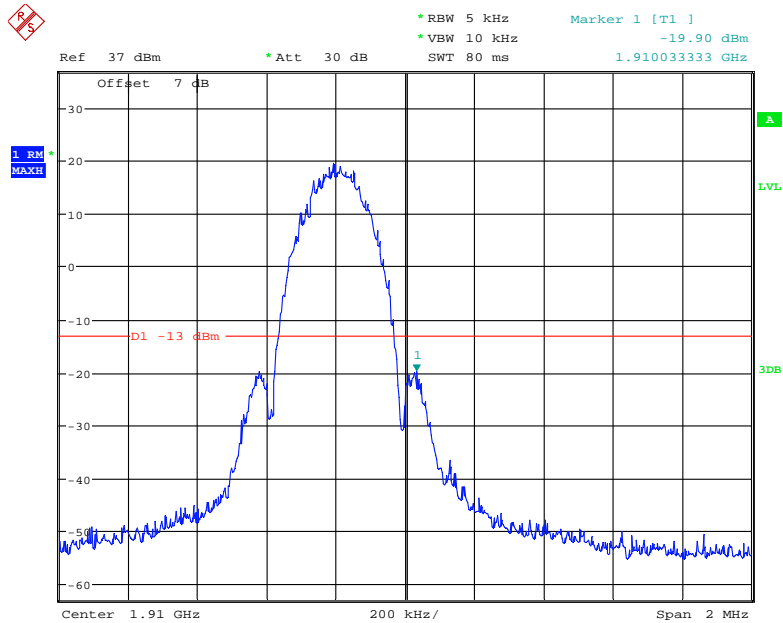
Date: 22.MAY.2021 00:54:45

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



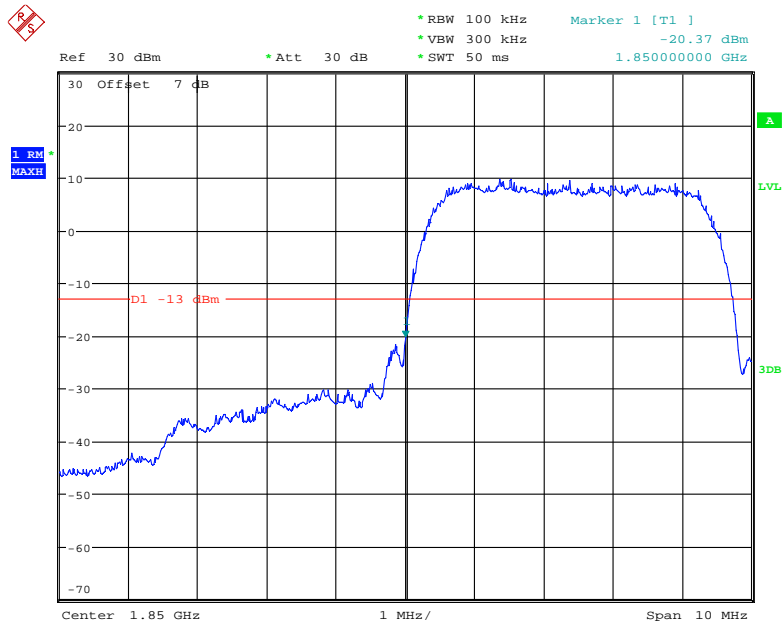
Date: 14.MAY.2021 23:42:26

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



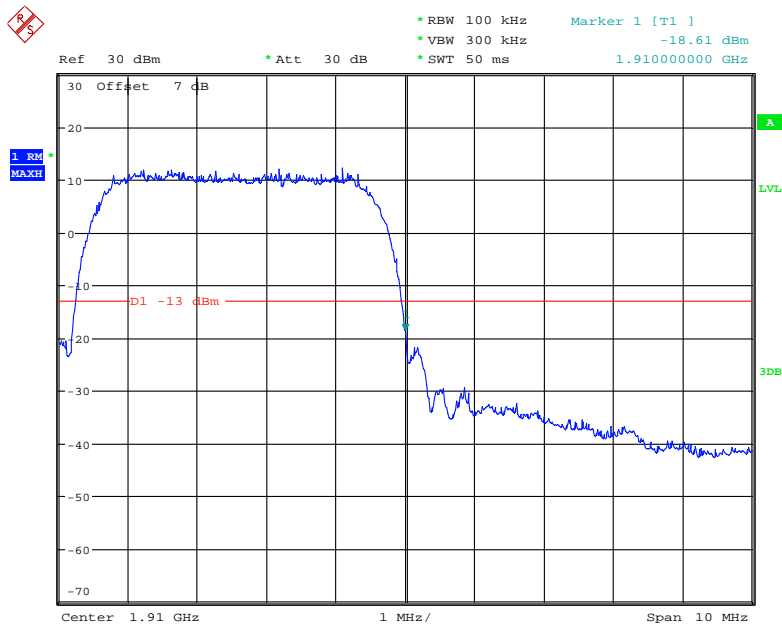
Date: 14.MAY.2021 23:45:01

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



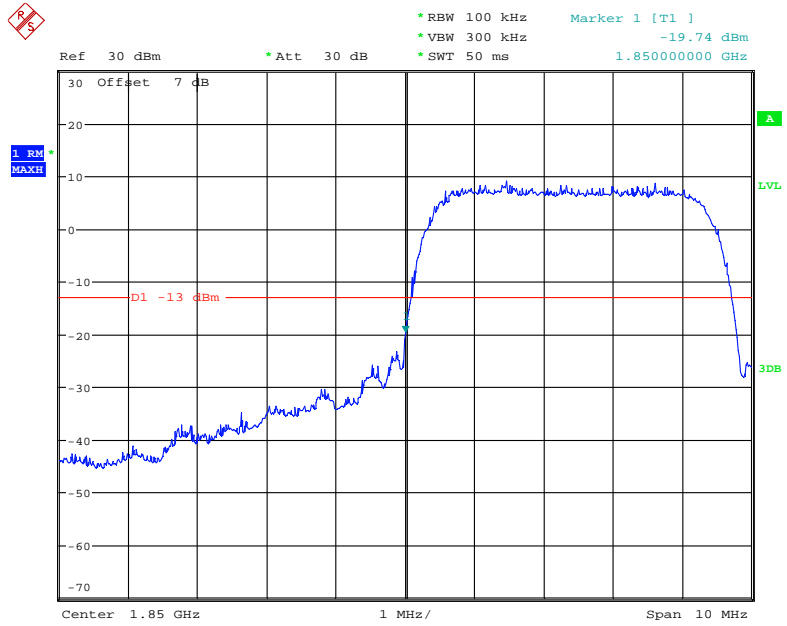
Date: 7.JUL.2021 22:27:31

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



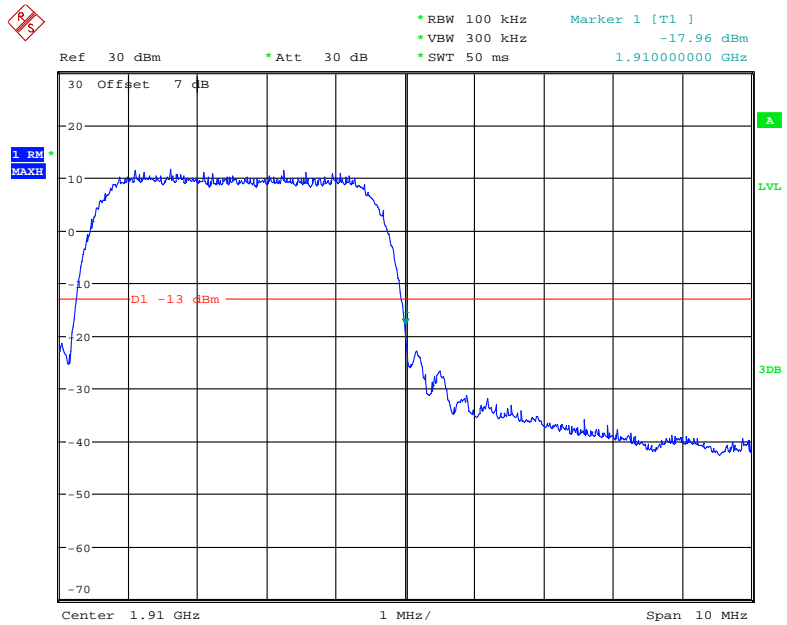
Date: 7.JUL.2021 22:27:58

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



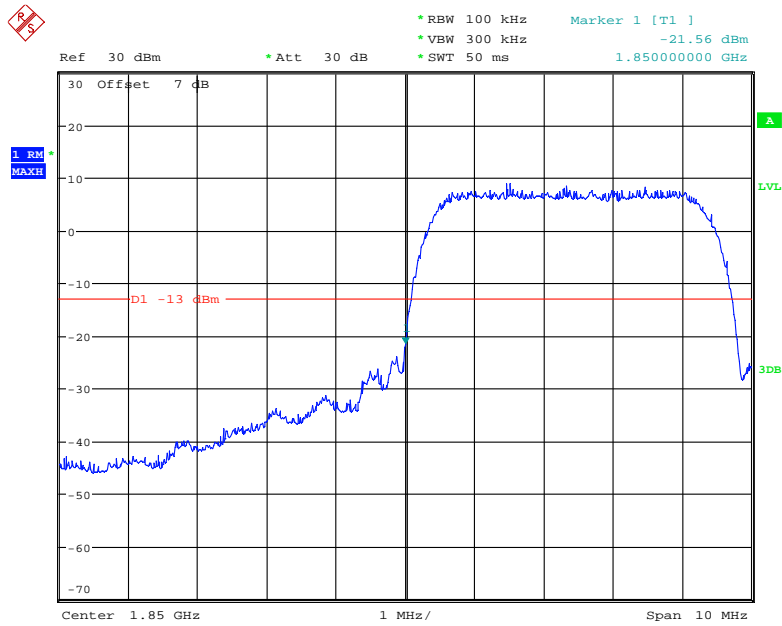
Date: 7.JUL.2021 22:44:28

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



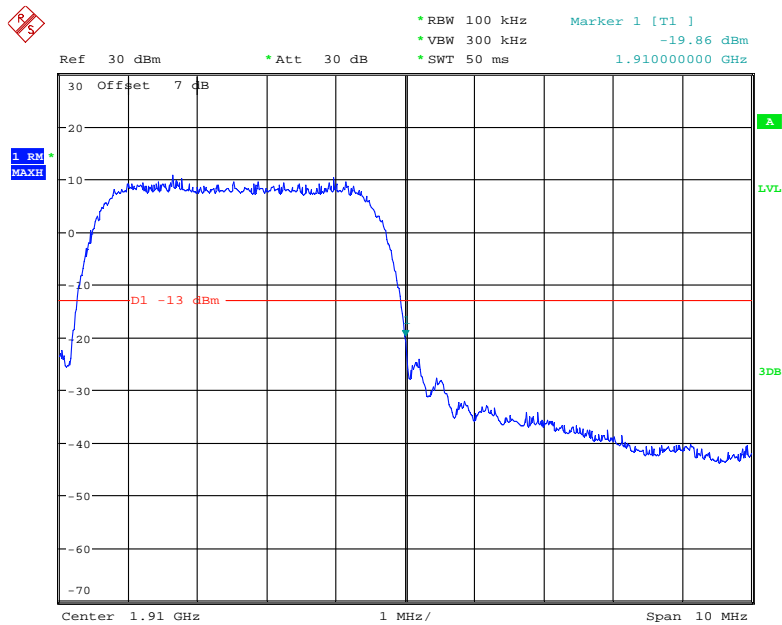
Date: 7.JUL.2021 22:43:56

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



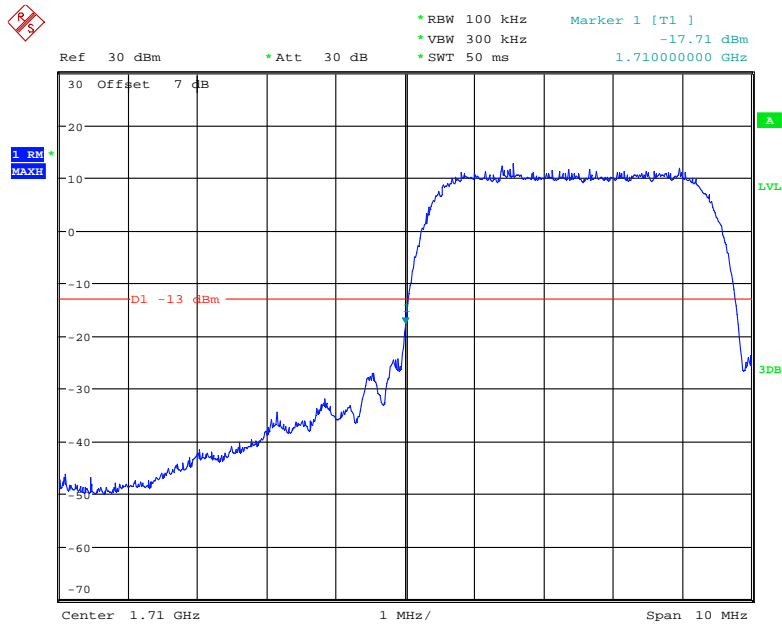
Date: 7.JUL.2021 22:50:04

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



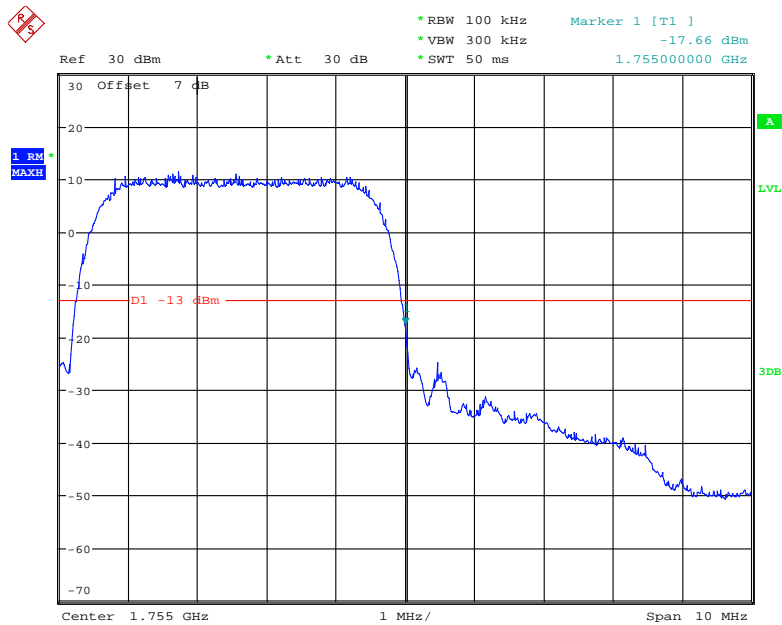
Date: 7.JUL.2021 22:50:36

AWS Band, Left Band Edge for WCDMA (BPSK) Mode



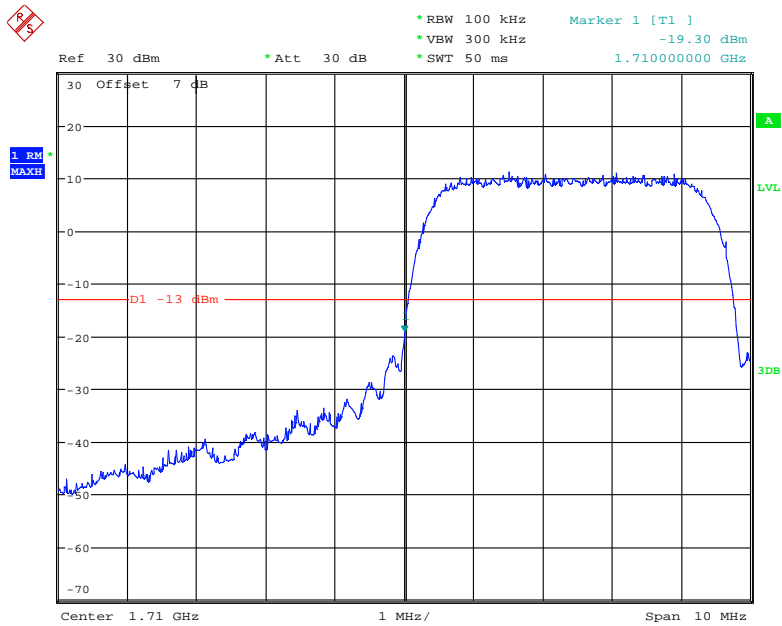
Date: 7.JUL.2021 22:26:24

AWS Band, Right Band Edge for WCDMA (BPSK) Mode



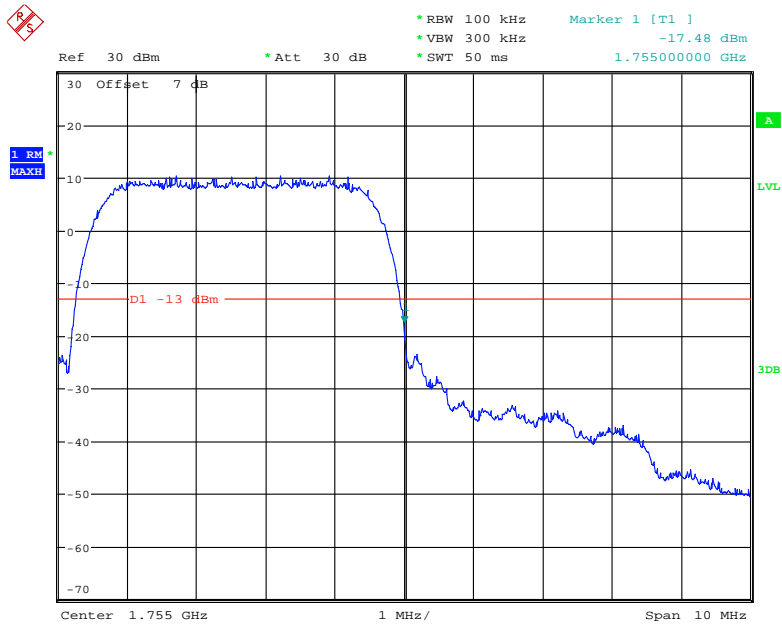
Date: 7.JUL.2021 22:26:48

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



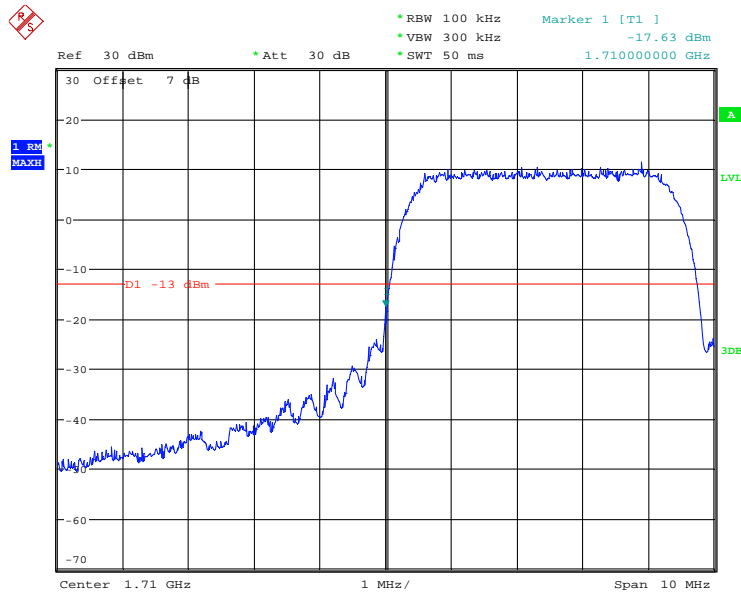
Date: 7.JUL.2021 22:43:19

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



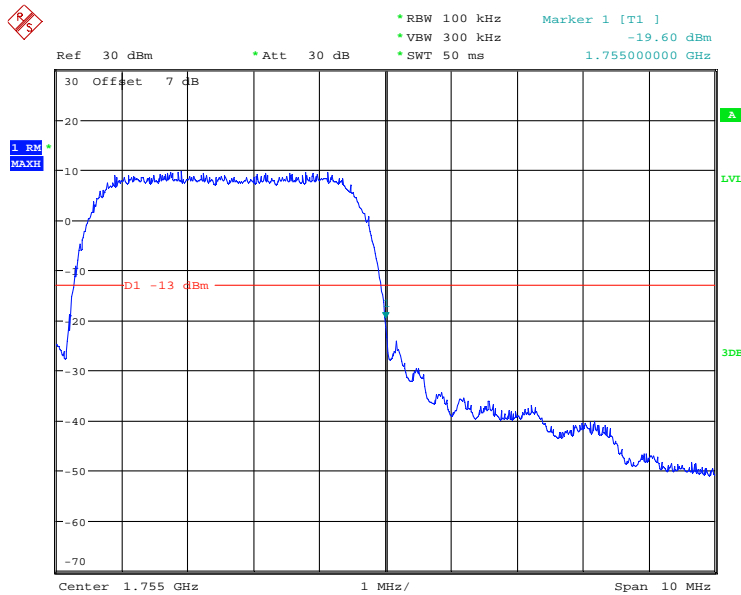
Date: 7.JUL.2021 22:42:35

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



Date: 7.JUL.2021 22:48:22

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



Date: 7.JUL.2021 22:48:57

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 and & §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

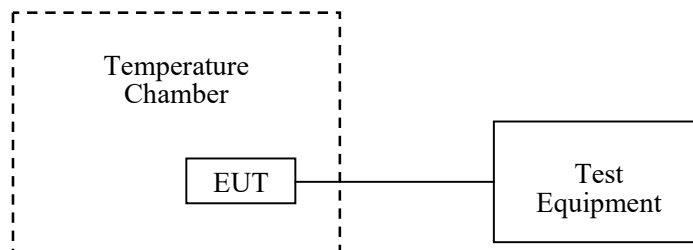
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC 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 DC 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:	26.2~28.6 °C
Relative Humidity:	52~60 %
ATM Pressure:	100.9~101.2 kPa

The testing was performed by Pedro Yun from 2021-05-14 to 2021-08-08.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables.

Cellular Band (Part 22H)

GPRS Mode

Middle Channel, f₀ =836.6MHz				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.6	8	0.0096	2.5
-20		6	0.0072	2.5
-10		9	0.0108	2.5
0		7	0.0084	2.5
10		4	0.0048	2.5
20		-6	-0.0072	2.5
30		11	0.0131	2.5
40		9	0.0108	2.5
50		7	0.0084	2.5
20		V min.= 2.8	8	0.0096
	V max.= 4.2	-9	-0.0108	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	3.6	3	0.0036	2.5
-20		5	0.0060	2.5
-10		7	0.0084	2.5
0		6	0.0072	2.5
10		8	0.0096	2.5
20		6	0.0072	2.5
30		5	0.0060	2.5
40		4	0.0048	2.5
50		2	0.0024	2.5
20		V min.= 2.8	5	0.0060
	V max.= 4.2	5	0.0060	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	3.6	6	0.0072	2.5
-20		9	0.0108	2.5
-10		8	0.0096	2.5
0		-5	-0.0060	2.5
10		7	0.0084	2.5
20		9	0.0108	2.5
30		4	0.0048	2.5
40		8	0.0096	2.5
50		7	0.0084	2.5
20		V min.= 2.8	6	0.0072
	V max.= 4.2	-4	-0.0048	2.5

PCS Band (Part 24E)

GPRS Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.6	6	0.0032	pass
-20		7	0.0037	pass
-10		9	0.0048	pass
0		6	0.0032	pass
10		-5	-0.0027	pass
20		4	0.0021	pass
30		7	0.0037	pass
40		6	0.0032	pass
50		8	0.0043	pass
20		V min.= 2.8	7	0.0037
	V max.= 4.2	9	0.0048	pass

EGPRS Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.6	6	0.0072	pass
-20		5	0.0060	pass
-10		4	0.0048	pass
0		7	0.0084	pass
10		5	0.0060	pass
20		2	0.0024	pass
30		3	0.0036	pass
40		5	0.0060	pass
50		2	0.0024	pass
20		V min.= 2.8	6	0.0072
	V max.= 4.2	6	0.0072	pass

PCS Band (Part 24E)

WCDMA Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.6	-6	-0.0032	pass
-20		7	0.0037	pass
-10		9	0.0048	pass
0		8	0.0043	pass
10		4	0.0021	pass
20		11	0.0059	pass
30		8	0.0043	pass
40		9	0.0048	pass
50		5	0.0027	pass
20		V min.= 2.8	-7	-0.0037
	V max.= 4.2	8	0.0043	pass

AWS Band (Part 27)

Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.6	1710.0567	1754.0945	1710	1755
-20		1710.1215	1754.6174	1710	1755
-10		1710.0395	1754.5403	1710	1755
0		1710.6865	1754.5808	1710	1755
10		1710.0689	1754.3940	1710	1755
20		1710.1448	1754.4867	1710	1755
30		1710.0593	1754.5206	1710	1755
40		1710.0122	1754.6058	1710	1755
50		1710.0774	1754.5031	1710	1755
20		V min.= 2.8	1710.0254	1754.4600	1710
	V max.= 4.2	1710.1329	1754.7246	1710	1755

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	3.6	8	0.0043	pass
-20		7	0.0037	pass
-10		6	0.0032	pass
0		5	0.0027	pass
10		4	0.0021	pass
20		9	0.0048	pass
30		2	0.0011	pass
40		6	0.0032	pass
50		5	0.0027	pass
20		V min.= 2.8	-9	-0.0048
	V max.= 4.2	7	0.0037	pass

Band 4:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.6	1710.5673	1754.4836	1710	1755
-20		1710.5480	1754.7456	1710	1755
-10		1710.7908	1754.5988	1710	1755
0		1710.4111	1754.5909	1710	1755
10		1710.5022	1754.7197	1710	1755
20		1710.9929	1754.6473	1710	1755
30		1710.6720	1754.3657	1710	1755
40		1710.5808	1754.7027	1710	1755
50		1710.2640	1754.8181	1710	1755
20		V min.= 2.8	1710.6932	1754.7870	1710
	V max.= 4.2	1710.8335	1754.4761	1710	1755

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	3.6	8	0.0096	2.5
-20		10	0.0120	2.5
-10		7	0.0084	2.5
0		-3	-0.0036	2.5
10		6	0.0072	2.5
20		8	0.0096	2.5
30		2	0.0024	2.5
40		7	0.0084	2.5
50		5	0.0060	2.5
20		V min.= 2.8	7	0.0084
	V max.= 4.2	3	0.0036	2.5

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.6	2500.7346	2569.3506	2500	2570
-20		2500.4654	2569.3379	2500	2570
-10		2500.0660	2569.7399	2500	2570
0		2500.4045	2569.8978	2500	2570
10		2500.7350	2569.2646	2500	2570
20		2500.9922	2569.9622	2500	2570
30		2500.0402	2569.9136	2500	2570
40		2500.5188	2569.7557	2500	2570
50		2500.1981	2569.7347	2500	2570
20		V min.= 2.8	2500.5648	2569.3007	2500
	V max.= 4.2	2500.6510	2569.4795	2500	2570

Band 12:

10.0 MHz Middle Channel , f ₀ =719MHz					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.6	699.6831	715.4526	699	716
-20		699.6850	715.9615	699	716
-10		699.2010	715.9538	699	716
0		699.3698	715.7197	699	716
10		699.4574	715.6894	699	716
20		699.6615	715.4221	699	716
30		699.9034	715.7333	699	716
40		699.6245	715.7376	699	716
50		699.7618	715.8579	699	716
20		V min.= 2.8	699.4414	715.1585	699
	V max.= 4.2	699.4650	715.5959	699	716

Band 13

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.6	777.3733	786.5686	777	787
-20		777.3228	786.5257	777	787
-10		777.3385	786.5096	777	787
0		777.2423	786.5695	777	787
10		777.2810	786.5104	777	787
20		777.3826	786.5773	777	787
30		777.0953	786.5141	777	787
40		777.1312	786.5232	777	787
50		777.3086	786.5654	777	787
20		V min.= 2.8	777.0928	786.5679	777
	V max.= 4.2	777.1793	786.5543	777	787

Band 25

10.0 MHz Middle Channel, $f_0=1882.5\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.6	-5	-0.0027	pass
-20		4	0.0021	pass
-10		3	0.0016	pass
0		-6	-0.0032	pass
10		4	0.0021	pass
20		-8	-0.0042	pass
30		-5	-0.0027	pass
40		6	0.0032	pass
50		8	0.0042	pass
20		V min.= 2.8	6	0.0032
	V max.= 4.2	5	0.0027	pass

Band 26

10.0 MHz Middle Channel, $f_0=819\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.6	-0.94	-0.0011	pass
-20		-4.15	-0.0051	pass
-10		-3.13	-0.0038	pass
0		2.17	0.0026	pass
10		5.52	0.0067	pass
20		6.18	0.0075	pass
30		-3.51	-0.0043	pass
40		7.21	0.0088	pass
50		-4.61	-0.0056	pass
20		V min.= 2.8	-3.12	-0.0038
	V max.= 4.2	-5.04	-0.0062	pass

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	3.6	-6	-0.0032	pass
-20		5	0.0027	pass
-10		4	0.0021	pass
0		-3	-0.0016	pass
10		8	0.0043	pass
20		-9	-0.0048	pass
30		-5	-0.0027	pass
40		7	0.0037	pass
50		11	0.0059	pass
20		V min.= 2.8	10	0.0053
	V max.= 4.2	12	0.0064	pass

Band 4:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.6	1710.5159	1754.9905	1710	1755
-20		1710.5758	1754.9208	1710	1755
-10		1710.5940	1754.8719	1710	1755
0		1710.5974	1754.7637	1710	1755
10		1710.2088	1754.5827	1710	1755
20		1710.9052	1754.1619	1710	1755
30		1710.5634	1754.9152	1710	1755
40		1710.6728	1754.9050	1710	1755
50		1710.8147	1754.5733	1710	1755
20		V min.= 2.8	1710.8315	1754.8488	1710
	V max.= 4.2	1710.5056	1754.9754	1710	1755

Band 5:

10.0 MHz Bandwidth, $f_0 = 836.5\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.6	4	0.0048	2.5
-20		5	0.0060	2.5
-10		-9	-0.0108	2.5
0		-3	-0.0036	2.5
10		8	0.0096	2.5
20		7	0.0084	2.5
30		-5	-0.0060	2.5
40		6	0.0072	2.5
50		3	0.0036	2.5
20		V min.= 2.8	9	0.0108
	V max.= 4.2	-8	-0.0096	2.5

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.6	2500.6919	2569.3869	2500	2570
-20		2500.5916	2569.8428	2500	2570
-10		2500.8305	2569.8023	2500	2570
0		2500.7425	2569.5177	2500	2570
10		2500.4395	2569.3200	2500	2570
20		2500.3317	2569.8970	2500	2570
30		2500.5724	2569.2835	2500	2570
40		2500.5406	2569.8446	2500	2570
50		2500.5734	2569.3827	2500	2570
20		V min.= 2.8	2500.4007	2569.0621	2500
	V max.= 4.2	2500.7684	2569.6255	2500	2570

Band 12:

10.0 MHz Middle Channel , $f_0=719\text{MHz}$					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.6	699.4569	715.3054	699	716
-20		699.4174	715.7888	699	716
-10		699.6655	715.8759	699	716
0		699.3380	715.9100	699	716
10		699.5902	715.9917	699	716
20		699.3951	715.9713	699	716
30		699.8356	715.6560	699	716
40		699.7868	715.6849	699	716
50		699.4936	715.6615	699	716
20		V min.= 2.8	699.2925	715.8369	699
	V max.= 4.2	699.2117	715.6891	699	716

Band 13

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.6	777.0601	786.4941	777	787
-20		777.2906	786.4919	777	787
-10		777.3385	786.4996	777	787
0		777.0869	786.4977	777	787
10		777.3407	786.5083	777	787
20		777.2480	786.4982	777	787
30		777.2946	786.5050	777	787
40		777.3207	786.5023	777	787
50		777.3623	786.4906	777	787
20		V min.= 2.8	777.0179	786.5034	777
	V max.= 4.2	777.4830	786.4905	777	787

Band 25

10.0 MHz Middle Channel, $f_0=1882.5\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.6	-7	-0.0037	pass
-20		6	0.0032	pass
-10		8	0.0042	pass
0		-4	-0.0021	pass
10		5	0.0027	pass
20		-4	-0.0021	pass
30		-6	-0.0032	pass
40		8	0.0042	pass
50		10	0.0053	pass
20		V min.= 2.8	11	0.0058
	V max.= 4.2	11	0.0058	pass

Band 26

10.0 MHz Middle Channel, $f_0=819\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.6	-2.78	-0.0034	pass
-20		-5.68	-0.0069	pass
-10		9.07	0.0111	pass
0		-4.62	-0.0056	pass
10		-9.31	-0.0114	pass
20		-2.82	-0.0034	pass
30		-6.68	-0.0082	pass
40		-8.85	-0.0108	pass
50		4.63	0.0057	pass
20		V min.= 2.8	4.05	0.0049
	V max.= 4.2	3.52	0.0043	pass

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